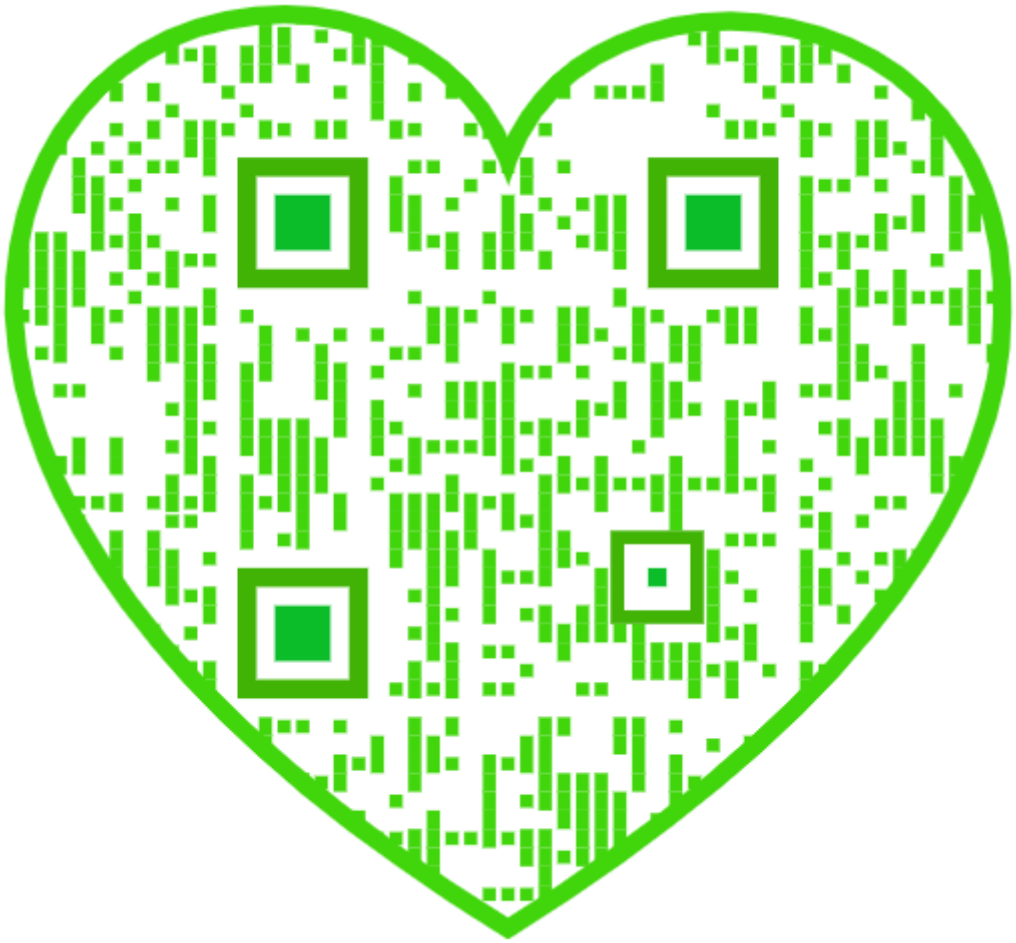

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THE ART OF

PAINTING IN OIL,

AND IN

FRESCO:

BEING A

HISTORY OF THE VARIOUS PROCESSES AND MATERIALS EMPLOYED,

FROM ITS DISCOVERY, BY HUBERT AND JOHN VAN EYCK,

TO THE PRESENT TIME:

TRANSLATED FROM THE ORIGINAL FRENCH TREATISE OF

M. J. F. L. MÉRIMÉE,

SECRETARY TO THE ROYAL ACADEMY OF FINE ARTS, IN PARIS.

WITH

ORIGINAL OBSERVATIONS

ON THE RISE AND PROGRESS OF BRITISH ART, THE FRENCH AND ENGLISH CHROMATIC SCALES, AND THEORIES OF COLOURING,

By W. B. SARSFIELD TAYLOR,

SENIOR CURATOR OF THE LIVING MODEL ACADEMY, &c. &c.

LONDON:
WHITTAKER & Co. AVE MARIA LANE.

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TO

THE PRESIDENT AND MEMBERS

OF

THE ROYAL ACADEMY.

MR. PRESIDENT AND GENTLEMEN,

THE time has at length arrived which I so much desired, and I have now the honour to lay before you, the translation of M. Mérimée's History of Oil Painting, &c.

The duty of translating that valuable work on art, it is not very probable I should have undertaken, but for the friendly advice which I received from several distinguished members of the Academy, and eventually for the kind permission which you

granted me, to dedicate this work to your Royal Institution.

This circumstance determined me to undertake the task, for it convinced me that a work on art must possess no small degree of intrinsic merit, with which the Royal Academy would allow its name to be connected.

Inspired by these considerations, I have given my best attention to this work, and have taken every method that my experience could devise to render it as useful in its new language as it is calculated to be in its original tongue. I have neglected no opportunity of consulting members of this Academy on technical points of consequence in the language of art; and I have the satisfaction to say, that I have uniformly experienced the greatest attention to my inquiries, and every good feeling for the promotion of the object in view.

Having done all that was in my power to render the translation correct, I have added a rapid, but correct outline of the rise and progress of British art, which I trust will not be without its use upon the public mind, together with ob-

servations on the methods and materials generally employed in the English school, and the English theory of colouring exemplified by a chromatic scale. In doing this, I was actuated by that love of art which is natural to me, to give a clear view of its true position,—at the same time pointing out to whom, and to what circumstances it owes its present condition.

Permit me now, Mr. President and Gentlemen of the Royal Academy, to offer you my best thanks for the kindly feeling with which you first excited my attention to this work, and which has continued steadily to its completion.

With feelings of the highest respect, I am,
Mr. President and Gentlemen,
Your most obliged and obedient servant,
W. B. Sarsfield Taylor.

REPORT

OF THE

INSTITUTE OF FRANCE.

THE following pages, by way of preface, are extracts from the report made to the Academy of Fine Arts in Paris, by M. Quatremère de Quincy, the Chairman of the Commission selected by the Royal Institute of France, to examine the manuscript work of M. Mérimée, on this very important subject, and to report thereon. They will be found very satisfactory, coming as they do from men of science and learning, who were eminently qualified to give a just decision upon the merits of any literary or scientific production.

THE REPORT.

" The Commission whom you have selected to examine the manuscript work of M. Mérimée, en-

titled, 'On Painting in Oil, being an account of the various methods and materials made use of by the professors of that art, from the time of Hubert and John Van Eyck, down to the present day,'—have the honour to present to you the result of their observations and their opinions upon this work.

"The precepts which the author has collected, extended, and developed, with the judicious advice he has offered, are not so much intended to teach this art, as to lay before the artist, the proper materials for painting, and how to make pictures durable. A principal object has been to collect and carefully describe the numerous processes used in oil painting, from its earliest appearance to our own time.

"The result of this investigation shows that the older masters of the Venetian and Flemish schools, did not paint as moderns do, with pure oils, but that they tempered their colours with varnishes; to which must be attributed the state of preservation in which we find their pictures.

"M. Mérimée describes the modes of preparing the different varnishes that are proper to mix with the colours, and also those which are to be used over the picture when finished. He also communicates the most exact ideas upon the colouring substances, their preparation, solidity or durableness,

their action, and influence upon each other when combined, the changes from the effects of light and air, to which they are liable, and likewise from the oily substances with which they may be united. He also points out the precautions to be taken for permanently preserving pictures, and the means by which they can be repaired when injured by time. He finishes his work by a theory of colouring, on the principles of natural harmony.

" The author commences his first chapter by setting it down as an incontrovertible fact, that the brothers *Van Eyck* were the inventors of painting in oil ; and refutes the assertions of *Theophilus* and *Cennino Cennini* on that question.

" He strongly points out the remarkable fact, that the pictures painted in oil, both in Germany and Italy, in the fourteenth and fifteenth centuries are in a better state of preservation, than the major part of the works which were painted at a much later period ; and particularly those painted in the last century. Hence he is of opinion that the process employed in the earlier times of this art has been greatly altered in its descent to us ; and that even the traditionary accounts of this method are very erroneous.

" The great object of the author appears to be,

that of bringing to light the primitive processes of painting; for this purpose he has consulted the earlier works on this art, and has examined with the greatest care, many of those pictures which have most successfully resisted the effects of time and exposure; and he is decidedly of opinion, that these works owe their preservation to particular modes of combining, in a liquid state, resinous substances; by the use of which the colours were defended from the action of causes that have injured or destroyed pictures of much more modern dates.

"From the commencement of the art, long before the discovery of painting in oil, the employment of varnish for the preservation of pictures from the action of the air was well understood; yet it is worthy of remark, that not one of the authors who wrote upon this subject at that time, mentions a word of varnish being incorporated with the colours, except *Armenini*, who, in 1587, advised the mixing of resinous substances with the oils in the colouring materials, and even in the preparation of the ground.

"M. Mérimée has closely examined, and analysed with great care, paintings of the earliest dates, and has consulted many of the ablest restorers of

pictures; and hence he is strongly of opinion, from the hardness of the ground, and the brightness of the pictures, that the colours have not only been incorporated with oil, but also with varnishes, even of that sort called 'hard varnish.' With respect to later works, almost all the pictures from the commencement of the sixteenth century are, as all those of the preceding one, painted on a white ground composed of chalk and size, primed with a couch of drying oil: the artists began their work with transparent colours; and when they had completed in this way their design and general effect of *chiaro 'scuro*, they completed their work with lighter tints, applied with a full pencil, which gave greater relief and consistence to the picture. This was the method pursued by the brothers Van Eyck, P. Perugino, L. de Vinci, Raffael, and Fra Bartolomeo.

"Another method was practised by Titian and Correggio. They used to lay in the first paintings with size, and to use only resinous liquids and transparent colours in finishing the picture. It is a very remarkable circumstance that the greatest of the colourists have employed these two opposite methods, and yet they have produced similar results.

"M. Mérimée is of opinion that the quantity of glazing observable in the works of the Venetian

and Flemish masters is a proof of the employment of varnish in their colours; but he adds, that we should be well aware of the great disadvantages which are the results of excessive glazing, or of its being unskilfully done; for we see pictures which appear of a brilliant character when fresh, that in a little time change and become of a dull and darker tone. And it is not a little worthy of observation, that the pictures of Titian, Paul Veronese, and Rubens, which are in the best state of preservation, are those which they painted upon distemper grounds.

"After having given a general review of the most celebrated artists of the schools of Italy and Flanders, M. Mérimée comes to the French school, which he dates only from the time of Simon Vouet; to whose influential example he attributes the small advances that the French school has obtained in the art of colouring. If, by this, it is to be understood that Vouet had the first school, there is proof that a number of very clever pupils were formed under him. It must be admitted, on the other hand also, that before his time France had some very clever artists, without reckoning those who settled there from Italy. If the school of Vouet did not produce great colourists, there would, perhaps, be some

degree of severity in extending the effect of such a pretended cause to all the succeeding painters in France; amongst whom are some to whom no one will deny the title of good colourists.

"M. Mérimée believes that he has traced the deterioration of our pictures to have followed as an inevitable consequence of the decay of our school. And adds, that as, since this school has become regenerated, the painters have proved themselves more careful, the colourmen more conscientious and better instructed; we ought, therefore, to indulge the hope that scientific knowledge, coming to the assistance of art, will bestow upon our pictures a more durable character.

"The second chapter treats of the nature and properties of the substances used in these compositions; and after some inquiries into the nature of the 'Atramentum,' or varnish of Apelles, the author takes a general view of the resinous and bituminous substances of which varnishes are composed, and also points out the different sorts of oil employed in painting; but it is in the preparation of the varnishes that we find a great number of new and valuable ideas, for the discovery of which we are indebted to the author.

"The fourth chapter, which in itself forms a con-

siderable part of the work, relates to the preparation of colours, and belongs properly to what may be termed the chemistry of painting; and we can bear ample testimony to the extensive and accurate knowledge of M. Mérimée, who it is evident has selected with judgment from amongst a heap of preparations and receipts, those which he found approach nearest to the simplicity of nature. For it is a remarkable fact, that the most permanent class of colours, are those which have been the slowest of creation in nature's laboratory.

" The fifth chapter treats of the preparations of the grounds for panels, cloths, and walls. This is one of the most useful parts; and the methods pointed out by the author, all tend to the preservation of the colours, and the durability of the pictures.

" The sixth chapter treats of the best method of preserving pictures, and describes the various injurious modes in use, for the purpose of giving them as it is pretended a new existence.

" The seventh chapter is entitled 'a theory of colours, as applied to the harmony of colouring.' After having clearly established this theory, which is founded upon the natural properties of colours, the author proceeds to develop the principles of harmony as applicable to painting, and in so

doing he places them upon their natural relations to each other. This part is not capable of analyzation, and detached extracts would only convey to the mind ideas of it that must be very imperfect.

" To these the author has added a chapter on fresco, which, though not mentioned in the title of the work, is yet one of great usefulness; whether we regard it in reference to the employment of this process of late years, or as to its great importance during several ages, concurrently with the art of painting in oil.

" Entrusted with the duty of rendering a faithful account of this work, the Commission are of opinion, that they have carefully pointed out the great utility and advantages, that must result to the art of painting from its publication.

" The Academy approves of the opinions contained in the report, and have directed that a copy of it be laid before the Minister of the Home Department."

(Signed,) QUATREMÈRE DE QUINCY,
(Permanent) Secretary to the Institute of France.

THE

AUTHOR'S PREFACE.

THE pictures of Hubert and John Van Eyck, with others of the same period, but by different artists, are now in a better state of preservation than the greater number of those painted in the last century: the processes used in their execution, having only been transmitted down by tradition, have not, it is very probable, reached our time perfectly pure; and it is reasonable to suppose that those pictures, that even now surprise us by their brilliancy after a lapse of three centuries, have not been painted with the same combination of materials, as those which we see evidently impaired, though not painted one-fourth part of that period.

If it were possible to discover a manuscript of Van Eyck upon the preparation and application of colours, there can be no doubt that the an-

nouncement of it would create a considerable degree of eagerness to possess such a treasure, especially amongst those who cultivate the art of painting: this hypothesis does not appear likely to be realized; but might we not gain the same object if we should be fortunate enough to discover those primitive processes, and modes of painting, by consulting carefully the earlier treatises on that art, and by an attentive examination of those ancient paintings, which have best resisted the numerous causes of decay to which such works are liable?

It appeared to me quite possible that this object could be attained, and I therefore determined to undertake those researches of which this essay is the result. If I have not performed all that I wished, or that may be achieved; still it will be admitted that a commencement has been made, and that I have traced out a way in which others may succeed with greater chances of success.

When a pupil of the French school has attained that degree of experience, which gives him a fair chance of gaining the first prize in the class of painting, there can be no doubt of his capability to make a copy from any picture of his master. Let him then be directed to copy a first-rate picture of the Flemish or Venetian schools, and I am

quite sure he will encounter difficulties which he will be unable to surmount, should he not have been made acquainted with the process used by the colourist whom he wishes to imitate; but if these processes have been shown to him, and if he have been taught the process for increasing the brilliancy and transparency of his colour, and how to preserve those fine qualities, or to recover them after he may have lost them; a practical knowledge of those methods may soon be acquired by a young painter, whose eye and hand have already attained to a high degree of correctness and facility; with such instruction he may then set about to copy a picture of Rubens, Rembrandt, Titian, and Vandyke, without experiencing any greater difficulties, than he would find in copying a work of his own master.

Every painter, in the course of his studies, feels in a greater or less degree, desirous of knowing the nature and fitness of the colours he employs, and there are few books that can give him much satisfaction in these respects; and the *Encyclopédie*, a work which ought to be the most replete with instruction, is that which contains the greatest number of errors.

Watin's book, published in 1772, contains much instruction; this work, which, considering the time

it was written, has a good deal of merit, has had a great circulation, and has gone through several editions; and as nothing better appeared, it was reprinted a few years ago.

M. Tingry, a Genevese professor of chemistry, has written a work in two volumes on the same subject, published in 1803. The author was too well informed to confine himself within the limits which would have been sufficient for a mere workman; he undertook with the aid of his own branch of science, to explain the theory also: this work would have been the best that could have been produced at that time, if he had united to the information he possessed, that knowledge which practice only can bestow. If instead of enlarging his book, by borrowing from others what appeared to agree with his own theory, he had confined himself to describing the experiments which he had made and repeated, his book would have possessed higher value. But at all times, the work of Tingry upon the preparation and use of colours and varnishes, is one of those that may be consulted with the greatest advantage. The two works just cited, are only intended for decorative painting, but there are two others, composed particularly for artists; the first was published at Rome, in 1813, by M. Marcucci, who had studied painting early in life,

when, being compelled by circumstances to take a situation in pharmacy, he preserved in this situation his first affection for art; and to console himself for his disappointment, he collected all that he could in chemistry, of what he conceived would be useful to, or likely to promote, the advancement of the art.

The work of M. Marcucci is divided into two principal parts; the first contains the methods of preparing the different materials used in painting; the other treats of the various methods used in the schools of Florence, Venice, and Flanders, in their most flourishing times. To these are added, the notes of a celebrated restorer of pictures at Rome.

Originally led away by the title of the work, I had intended to have translated it, and to have made additions to it where necessary, but I gave it up, as I found it would be requisite to recast the whole of the first part; yet being the work of one acquainted with chemistry, it should have possessed more useful instruction.

Doubtless the author has not thought it requisite to bestow all the care upon it of which he was capable. He contented himself with choosing, among divers works, the processes which he thought most likely to succeed, but without trying them himself, as he ought to have done. He may have

supposed, that in large cities, where great painters reside, their wants are easily supplied by commerce: this may be true so far; but it happens sometimes that an eminent painter may reside unavoidably in a place where such resources are not to be found; would it not then be of importance that he should have the power of preparing or directing the preparation of whatever his works may require?

The second part of the work is the best: it contains observations that are highly interesting, upon the operations of the old masters. M. Marcucci rightly judged that it would be most proper to consult on this subject a person of great knowledge in the art of restoring pictures. In fact, it is by the process of restoring, that discoveries are made of the various methods of the schools, as well as the particular method of each master.

The second work is that of M. Bouvier, himself a painter, and member of the Society of Arts at Geneva. He published it three years since, under the title of "Manual for Young Artists and Amateurs in Painting."

In this work, which is the fruit of long experience, the author does not treat of the nature of colours and their preparation, but merely the effects that are produced in the employment of them.

In treating of the practical method to be used in

the various stages of painting, he goes into details that would appear superfluous to those who, being placed under the instructions of a skilful master, are therefore acquainted with the various means and resources of art; but it is chiefly arranged for the use of persons living at a distance from large cities, in which are to be found the best methods of instruction, and every material necessary in the exercise of the art. Even persons who enjoy situations the most favourable for their instruction, will find in the Manual of M. Bouvier some things of which they were ignorant, and the knowledge of which will be of advantage, relating to the effects of certain colours, and the precautions requisite to be taken in their preparation and employment.

The artists for a long period either prepared the colours themselves, or else had them prepared under their immediate inspection, as well as the oils and varnishes which they used. This was the business of the pupils at the commencement of their agreement, so that, before they began to handle the pencil, they had acquired a knowledge of all that was most proper to give pictures durability. In after times this became changed, and the preparation of the materials became exclusively the business of traders, who had a stronger feeling towards their own immediate profit, than any regard to the

preservation of pictures. The artists then, no longer learning the nature of their colours, were incompetent to detect fraud, or distinguish the good from the inferior sort, and therefore used such as came to their hand, and even some preferred those which were sold at the lowest prices.

To such causes may be ascribed the rapid change that has taken place in the greater part of the pictures of the last century; but as it happened in that time that our (the French) school had reached the lowest point in its decline, this would not be a subject of regret to the admirers of art, if the works of Boucher and some other able men had not appeared at the close of that age.

In proportion as the school has regenerated itself, the artists have become more careful; and the business of preparing colours has become very lucrative: the number of establishments has increased, and some of the proprietors have a knowledge of chemistry, and those who are not acquainted with that science are so convinced of the advantages it bestows, that they educate in it those of their children who are to succeed them in their business; so that in the next generation there will not be a colour-maker of respectability, who shall not possess a knowledge of chemistry equal to those who prepare our medicine.

The principal object of this essay being to show the various methods of painting in oil which have been in use from the time of Van Eyck, down to these days, a full description of what has thus been collected should form the commencement of the work; and from these researches I have arrived at this conclusion, namely, that the most ancient painters of the Venetian and Flemish schools did not paint, as we do, with pure oils, but that they tempered their colour also with varnish, and to this is to be attributed the great preservation of their pictures.

I intend, then, to describe the methods of preparing different kinds of varnish, either for mixing with colours, or merely for covering pictures when finished, to give clearness and brightness to the work, as well as to defend it against the action of such substances as would injure the colours.

In like manner, I intend to lay before the reader the most correct information that I have been able to obtain relative to the colours used by the painters; the preparation and solidity of these colours; their action upon each other when mixed together in various degrees; the alterations to which they are liable from the action of light and air, as well as from the oily substances with which they are combined.

Finally, I shall point out the precautions that should be taken for the preservation of pictures, as well as the means to be employed in repairing the injuries to which they are liable.

It would perhaps be expected, that having described the processes of the ancient painters, I should point out those to which I would give the preference, but this is not a part of my duty. The modes of operation depend very much upon the greater or less degree of facility which the artist may possess: Rembrandt was obliged to return to his work repeatedly; he had not the power of painting it all up at once like Rubens: therefore each must choose that method of operating which is most convenient and agreeable to himself. I am bound to give an account of what has been done, but not to lay down rules for the guidance of others. I was of opinion all along, that at the close of a work the special object of which relates to the preparation and use of colours, I should be enabled to explain the theory of colours as applicable to the harmony of colouring. Without an harmonious arrangement, brightness and transparency of colour cannot produce an agreeable combination to the eye. This most interesting part of painting, has hitherto been treated in a manner altogether empirical. I conceive that the only

way by which its principles can be comprehended, is to found them upon the natural laws of colours.

Many persons who had been apprised of the work I had in progress, having requested me to add to it some instructions in *fresco painting*, I at first declined to do so, on the ground that I was not sufficiently acquainted with it practically: but afterwards, upon a careful examination of the ancient frescos, and having attentively consulted the best works which describe the processes, I found out the chief cause why the frescos of later times have more the appearance of distemper painting, than resemblance to the fine frescos of older times; consequently, I have determined to devote a few pages to that species of painting, hoping that they will not be without utility in the arts.[1]

[1] It was not until the moment when I had made my preparations for printing this essay, that I was told of the work which *M. P. de Montabert* was about to publish; but my occupations did not allow me sufficient leisure to read the whole of that *Traité complet de la Peinture*. I have only been able to take a cursory view of those parts which relate to subjects of which I have specially treated; and I have experienced great satisfaction in finding that we have adopted similar views on points of the first importance. M. de Montabert is of the same opinion with me, namely, that the preservation of the pictures by Van Eyck, and others who followed his method, is owing to the employment of varnish in the painting; and we also agree in thinking that "harmony" ought to have for its foundation the natural laws of colouring. I consider this opinion as important in aid of mine, coming as it does from an artist who has so deeply examined into every principle of his art.

INTRODUCTION.

THE translation of M. Mérimée's "History of Oil Painting," which I have now the honour to lay before the British public, was originally suggested to me by some very distinguished artists, members of the Royal Academy[1]. These gentlemen were themselves well acquainted with that treatise, and described it to be, as a practical work, of great value in the arts. The partiality which this account of the book excited in me was further corroborated by the President, and several other members of the Academy, who had the volume in their possession. Finally, having determined to undertake the translation of it, I applied to the Royal Academy for their sanction; and I received permission from these gentlemen to dedicate it to them in their

[1] Sir Augustus Wall Callcott, Sir David Wilkie, Mr. Etty, Mr. Mulready, Mr. Hilton, Mr. Phillips, and Mr. Cooper.

public and collective capacity. Having obtained the opinion and sanction of such competent judges of its merits, I no longer hesitated to commence the translation of the work; which, after many interruptions from other engagements, I have at length completed.

Had that work been originally my own, I would not have said much about it; but as it is the work of another, I may be permitted to state in commendation of it, that it has, in its original language, received the approbation of one of the most learned and scientific societies in Europe,—I mean the Royal Institute of France; and to the Report of the committee of that learned body, I beg leave to refer my readers.

That M. Mérimée, therefore, was fully competent to produce, and has produced, a work highly useful to the arts, there cannot now be any doubt; and to have done this, it required that he should possess, not only considerable skill and experience as a painter, and accurate historical knowledge, but also extensive experience as a practical chemist. These various qualities M. Mérimée possessed in an eminent degree; and therefore he was peculiarly well qualified for the difficult task which he had undertaken.

Independently of the instructions conveyed to painters, his advice will be found, we think, eminently useful to those noblemen and gentlemen who, having valuable collections of pictures, will thus be enabled to superintend the restoration of them; or at least the possessors of these fine works will be placed more on their guard against the practices of ignorant picture-cleaners, who do so much mischief to the noblest works of art.

Against the artifices of the inferior sort of colourmen, he also gives some excellent advice, and shows us that a great number of good pictures have suffered much, others have been ruined, by the employment of materials made up in a fraudulent manner.

The receipts for manufacturing the colours, oils, and varnishes, of the purest and best kinds, at a moderate expense, will be found very valuable, not to artists and amateurs only, but also to the colourmen.

That section describing the proper methods of preparing panels, canvases, and walls, is, perhaps, amongst the most valuable in the whole work, as every artist knows that the preservation or destruction of his colouring depends mainly upon the preparation upon which the materials are laid.

The chapter on colouring, and on the harmony

of colours, is one of very high interest to colourists. It lays down the principles of harmony, and explains the causes of discords in painting, with accuracy so far as those principles are known amongst French artists. With us these are not new, but are corroborative of the principles deduced long since in this country, from the experiments of Newton on light, which gave rise to the first chromatic scale, as applicable to painting; which scale was composed by Moses Harris, in 1776, as our readers will see in the "Original Observations," at the close of this work: so that we had the precedence in that respect by above fifty-four years, and yet it is curious that Harris's chromatic scale, which was published at the time specified, in his "Natural System of Colours," seems to have been very little known in London, the very place where he published it; and it was almost forgotten, until Mr. Phillips, R.A., introduced it in his course of lectures at the Royal Academy, about twelve years ago. The reasons given in explanation of what are the causes of harmony in colouring are more profound and philosophic in the work of Mr. Harris than in that of M. Mérimée, although their general principles agree.

The information on "Frescos" is altogether new

in this country, and is likely to prove an acquisition to our artists in time, if the nobility and men of fortune, or the directors of public works, demand that it shall be carried into operation. It is a splendid art, when properly executed in suitable situations; and in this climate it would have a very fine effect, if employed for interior decoration.

With respect to the "Original Observations," at the close of the volume, they arose in the Author's mind long since, in consequence of the scarcity of sound information, which still exists in English society, with respect to a general and correct view of the rise, progress, and condition of the arts in England.

An historical sketch is therefore submitted to the public in a chronological form, as the best calculated to give a clear and consecutive view of the whole question of the arts, from the earliest records in England. It will thus be seen at a glance, that the art of painting has not been decidedly naturalized in this country for a longer period than seventy or eighty years; we shall then find that the honours and profits of this profession were, with a very few exceptions, exclusively in the hands of foreigners, the greater part of whom returned home when they had realized some property, and

then sent over other parties to supply the demand for pictures; but no attempt had been made to establish a school to instruct the natives, nor were the latter properly encouraged, even when some of them did display good talents.

It is therefore quite evident, that our native school of arts did not *commence* until the time of Hogarth, Hudson, and Reynolds, but it was not properly established until the chartered society of native artists commenced their living model school in St. Martin's Lane, 1760 ; and it only became permanent when the Royal Academy was embodied by George III., in 1768, (seventy years;) and during that brief period we should think it would be difficult, if not quite impossible, to point out any school of painting which has advanced more rapidly in improvement; we should also recollect, that whatever encouragement our school may have received, is from the private funds of the nobility and gentry of this country, and not at all, as in the continental schools, from the State treasury, as a remuneration for great works executed for the public edifices. Besides, it should be recollected, that the schools of Italy were full two hundred years (1260 to 1480) in activity, before they displayed works much above mediocrity, though

assisted by every sort of encouragement, public and private, and that the highest honours were at that time conferred upon the professors of the arts.

The northern schools of Europe were still slower in arriving at the power of producing such splendid works, as Rubens, Vandyke, and Rembrandt have left us. It is clear, therefore, that the cases of those schools, and of ours, are not at all parallel: they are by no means analogous to each other; and therefore the reasoning applicable to one class cannot have the slightest application to the other. And it was from the erroneous idea, that these cases were parallel, that false reasoning was applied to them, and consequently the most erroneous opinions were held, and injurious reflections were freely thrown, not only upon the British School of Art, but even upon the intellectual capabilities of the nation.[1]

The object of the writer of this essay being solely to lay before the British public a plain historic sketch, supported by a few strong facts, to show the state of neglect with which the English artists

[1] Banks and Flaxman have shown what British talent can do in sculpture; so have Rossi and many others now no more. And we have at present some of the ablest sculptors in Europe, native-bred artists.

had contended so long in their native land, and thereby to disabuse the general mind, of the distorted and erroneous notions which still float indistinctly through society on that subject, to the detriment of native talent, he now feels himself called on to state, that his arguments have nothing whatever to do with the foreign artists of the present time. The facts regarding those of previous ages are stated merely to prove that there was a bad and unnatural system pursued generally by the English governments of those days, for which the foreign artists were not accountable; and to show that, whilst every other government in Europe was justly emulous to elicit the native talents of their people, our monarchs and statesmen, with the exceptions stated, were acting directly contrary to those rational purposes.

At present, however, these matters are greatly altered for the better: there is evidently a good deal of encouragement for pictures, and other works of art, not, to be sure, of the highest class of art; but in the classes that are encouraged there is, in general, much, very often high, talent displayed: and if our school may have got the character of being more of the ornamental, than of the historic, or epic style, this may well be accounted for,

when we see how very small the encouragement is for works of the higher classes of poetic or historic art.

In Queen Anne's reign there were three good native artists,—the two Olivers and Cooper; in Queen Victoria's reign there are most probably three thousand artists, most of whom can paint well —many of them are men of very superior talent: this must prove, that so soon as the incubus of neglect or contempt was removed from the native arts, these intellectual pursuits soon sprang into a vigorous existence.

The chapter on colouring, with the chromatic scale, was quite indispensable to show our prior claim to the discovery of the diagram, which so clearly points out the inseparable connexion between the prismatic colours of the divided rays of light, and the harmony of colouring as applied to pictures.

In concluding this introduction to the work, the author cannot omit the opportunity of gratefully acknowledging the kind attention of those members of the Royal Academy, and of the profession generally, who have encouraged him in this somewhat arduous task, which, from its scientific and technical character, required repeated revision. In committing the result of his labours to the public, he

trusts it will be found that the work has been executed with fidelity.

In performing the duty of an historian, he has selected his facts from the most authentic materials; and having no other object in view but the substitution of just ideas for those obscure and erroneous notions which still exist amongst us, to the prejudice of our School of Arts, he cannot suppose he has given cause for any ungracious reflections; but in the pursuit of truth he would not think of averting the unjust sentence of the illiberal, or of conciliating favour at the expense of justice.

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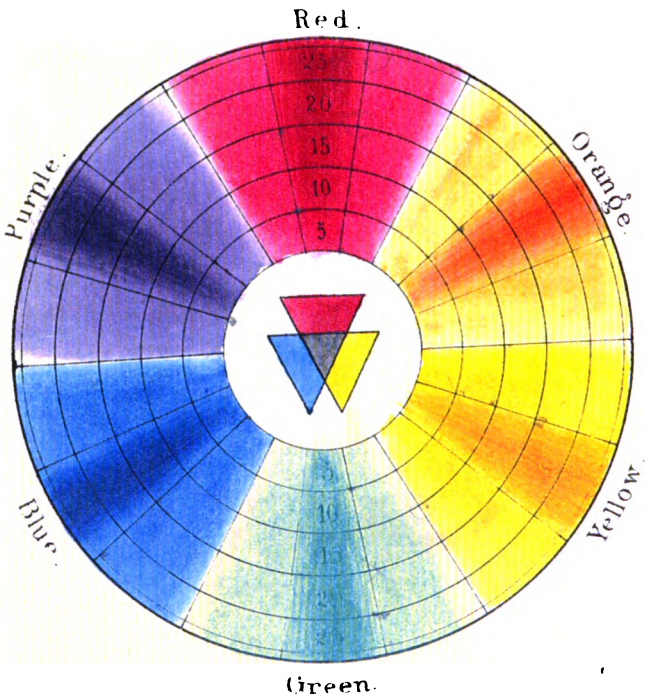
ERRATA.

Page 34, line 21, *for* che si fania, *read* che si faccia.
Page 81, lines 8 and 9, *for* parts *read* drachms.
Page 182, line 5, &c. *for* grains *read* drachms.

English Chromatic Scale. (M. Harris's)



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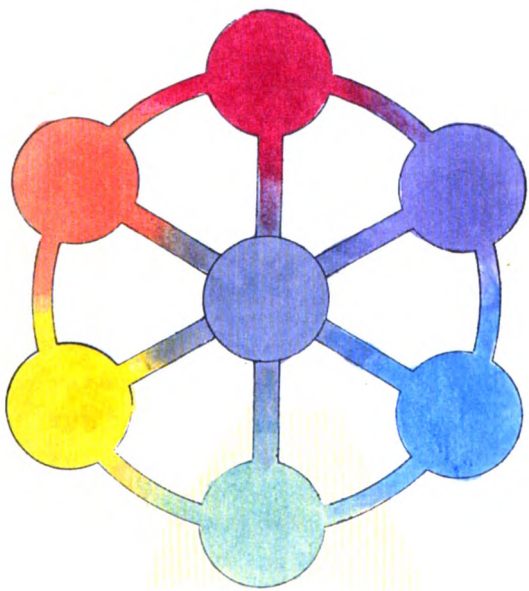

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THE ART

OF

PAINTING IN OIL.

CHAPTER I.

AN ENQUIRY INTO, AND OBSERVATIONS UPON, THE VARIOUS METHODS USED IN OIL PAINTING, FROM THE DAYS OF HUBERT AND JOHN VAN EYCK TO THE PRESENT TIME.

For a long series of years it has been the general opinion, that John Van Eyck was the original discoverer of painting in oil. Some learned men have, however, maintained that this art was practised long before the era in which that painter lived. But supposing that they could demonstrate the truth of their assertions, still we are not bound to conclude that Van Eyck had any knowledge of whatever attempts may have been made in that way before his

time; and he cannot be deprived of the merit attached to a discovery like this, so important to the arts.

One thing, however, is quite clear; which is, that, in the time of Van Eyck, the arts had made such progress, that the discovery of painting in oil could not have been much longer delayed. This event was in some degree inevitable; and it is surprising that the invention did not take place at the same time, in all those countries where the arts were successfully cultivated[1]. At that period the

[1] For some time previous to the fifteenth century,* almost every colour now in use was known. Painting on glass was practised with great success; enamels were fused to be employed for mosaics; and, by the aid of commerce, the artists could and did obtain the Ultramarine, India lake, and Chinese vermilion; and they likewise understood how to prepare them. Cennino Cennini, in his Treatise on Painting, published in 1437, describes a process by which the ultramarine was extracted from lapis lazuli; and he also mentions the lakes which were extracted from the resin-lacs, or that were prepared from the shearings of wool: and it is from similar shearings of a crimson tint that the species of lake was made, the mode of preparing which has been described by Neri, in his treatise "Del Arte Vetraria." In fact, the varnishes had been in use for some centuries; and the discovery of distillation had enabled the chemists to produce the volatile or essential oils with which the varnishes, when too viscous, might be diluted, and rendered as liquid as might be required.

In 1781, Dr. Raspe published, in London, a dissertation to prove that the discovery of oil painting was erroneously attributed

* The celebrated *Cinque Cento.*

artists all painted in distemper, or, as it is commonly termed, "body colours;" and they after-

to the brothers, Hubert and John Van Eyck. In support of his opinion, the author produced an unedited Latin MS., entitled *De Arte Pingendi.* This work, which appears to have been written by Theophilus, a monk, towards the close of the tenth, or commencement of the eleventh century, Dr. Raspe brought forward, as proving incontestably that, from a very remote period, pictures were painted in oil. I have read that treatise with the greatest attention; and, so far from discovering any proofs to support the learned Doctor's opinion, I have found quite enough to refute that idea, as we shall see presently.

Theophilus has accurately described a method of making linseed oil, and also a species of varnish composed of this oil and of a resinous gum, which appears to have been *copal.* He then points out the manner in which walls, wood-work, and even statues, ought to be painted; but *he does not any where give advice to apply oil painting to pictures.* And further, in refutation of Dr. Raspe, we find that Theophilus directs the *house-painters* by no means to lay on a second couch of colour until the first is completely dry; and he adds this remarkable passage, that *such a method would be too slow and too laborious for painting pictures.* (*Quod in imaginibus diuturnum et tædiosum nimiùm est.*)

Had Dr. Raspe been acquainted with the manuscript written by *Cennino Cennini,* which was published a few years ago, he, no doubt, would have produced, as undeniable evidence, some passages in the eighty-ninth and some following chapters, in which the author treats particularly on the methods of *painting in oil upon walls and wooden panels;* a practice which he assures us was very much practised in Germany (*che l'usano molto i Tedeschi*). Yet these passages of the work do not afford any better proofs than those in the treatise by Theophilus: for we know that the brothers Van Eyck painted in oil more than ten years previous to 1437,—the year in which Cennini finished his treatise.

Hubert Van Eyck died in 1426, leaving, in an unfinished state, the pictures in oil, which he had been engaged to paint for a chapel in the Church of St. John, at Ghent. These pictures were

wards coated their pictures with varnish, which communicated a transparency and brightness to the colours, defending them, at the same time, against the injurious action of the atmosphere.

The idea of mixing the colours, in the first instance, with varnish, is sufficiently obvious, not to have suggested itself to the human mind; and it is not unlikely that some artists had already attempted

completely finished by his brother in 1432. One of these works, representing "The Lamb" in the Apocalypse, was in the collection of the Louvre, previous to 1815.

It is impossible but that Cennini must have heard a report of pictures being painted in oil by the Flemish artists, whom, in all probability, he confounded with the Germans: hence, not being at all acquainted with that process as used for pictures, but merely the process employed in *house-painting* and *decorating*, he describes that method of using it exactly as Theophilus had done several centuries before his time, and as it was practised in his day to paint walls, wood-work, and casts, or other objects of sculpture. He directs that the linseed oil should be reduced to half its quantity by boiling, or by exposure for a sufficient time to the heat of the sun. It is with this viscous oil only that he directs the colours to be tempered; but he does not give us any idea how the colours might be rendered more liquid, or how to facilitate the drying of the slow dryers; and he then directs that the tints should be put into small pots of glazed earthen-ware, in the same way as practised for fresco painting. It is quite evident that Cennini could never have had practical knowledge of the process which he describes *.

* Vide the Journal of Ghent, *Messager des Sciences et des Arts*, in which several articles are inserted, in November, 1823, July, August, and September, 1824.

to make it available; but many difficulties were to be surmounted ere a novel method could be fairly substituted for that of distemper, to which they were habituated; the artists, in fact, not having the requisite information or knowledge of the means by which their efforts might have been successful.

The varnish in use at that period was of an oily and very viscous nature; nor did the practitioners know how to render it sufficiently fluid to mix well with the colours, and thereby render them equally manageable as they are in distemper. Besides this, we know that there is a great diversity in the action of the oil on various colours; some of them, for instance, massicot, white lead, and raw umber, give a drying quality to the oils, whilst others, such as lakes, animal charcoal, and bituminous earths, produce quite the contrary effect. The artists of that time, moreover, had not the methods of preparing the oils so as to obviate these difficulties, and to cause the drying process to be carried on equally and expeditiously with all the colours at the same time.

Van Eyck, it appears, was the first to discover a remedy for these defects; and if he may not be allowed the honour due to an original discoverer, he cannot be denied the merit of having carried the

preparation and use of colours to a degree of perfection which has never been surpassed, and to which indeed we have, even now, scarcely arrived, notwithstanding the great advancement of scientific knowledge since that era. In fact, his pictures are in a higher state of preservation than the greater part of those which have been painted two centuries later than his time.

Biographers, who have transmitted to us some accounts of Van Eyck, give it as their opinion that he was compelled, by necessity, to seek a new method of painting. It is stated by these writers, that the varnish with which he coated his pictures could only be dried by the solar rays. They state further, that in one of these operations the panel on which a picture had been painted was split by the sun's heat; and that these circumstances determined the artist to try some other means, which would ensure him from the danger of losing, in a moment, the fruits of a long and laborious study.

Perhaps the truth of this anecdote may be doubted; but one thing is certain, namely, that the imperfect nature of distemper painting was quite a sufficient motive to cause that artist to make the researches which are attributed to him.

This painter possessed the art of imitation in a

very high degree. Therefore, to reduce the difficulties of manual labour, and to increase the resources of art, were sufficient incitements, it would appear, to inspire him with a desire of obtaining a new vehicle, by means of which the colours, when dry, would preserve the transparency and brilliancy which they possess at the moment of their being applied to the canvass, and which medium, at the same time, would allow them to dry so gradually as to give the artist sufficient time to combine his half-tints, and produce the effect of those insensible gradations of shade which we see in nature, and producing in art that relief or effect called *chiaro 'scuro*.

Thus, as I have already observed, the idea of incorporating the varnish with the colour, being the most simple, we may infer that it would naturally, in the first instance, occur to the mind of Van Eyck. The object of his researches would have been but imperfectly fulfilled if his colours had been prepared as ours, and, equally liable to dry in, had required the aid of a coat of varnish to draw out their clearness and brilliancy.

However probable the foregoing suppositions may appear, it is not on such a basis that I would attempt to establish my opinion; that is founded upon the closest possible examination of ancient oil-

pictures. This examination, which was undertaken purposely to discover the primitive modes of painting, has demonstrated to me that, in the pictures of Van Eyck, as well as those of the painters who followed his method, the colours have not been used simply with oil of a more or less drying quality, but that they were mixed with varnish; which is the cause of the surprising preservation we witness in so many of the earliest pictures, and which have retained their brilliancy of tone much better than the greater part of those which were painted in the last century. Having formed my opinion from my own observation of the ancient pictures, I sought for a corroboration of it in the works of different authors who have written on the arts. I have consulted the treatises of Leonardo da Vinci, Paul Lomazzo, Vasari, Gerard de Lairesse, and also the two most ancient writers with whose works we are acquainted, Cennino Cennini and Theophilus. I expected to have found in the course of these researches a complete elucidation of the preparations and uses of colours; but my hopes have not been realized as I could wish. Yet I have not been wholly disappointed; and I shall lay before the reader all the testimony which I have been able to collect on this subject.

We are told that Julius II., who had invited Leonardo to Rome, and had engaged him to decorate several walls of the Vatican, had also the curiosity to enter the atelier of this great artist while he was absent. Here, instead of finding, as he expected, designs and cartons for the work, he saw only some chemical apparatus and utensils, which he understood were for the preparing of varnish. "This artist," said Julius, "begins his work where others finish." Mr. T. Sheldrake, an English artist, quotes this passage in a memoir written to show the advantages derivable from the employment of varnish in painting; and he considers this as a proof that Leonardo was in the constant habit of mixing varnish with his colours.

There would be little difficulty in proving any theory, if we could admit testimony so vague as this; for the chemical apparatus which the Pope judged were intended for the making of varnishes, might as well have been used for making drying oils, or for rectifying oil of turpentine,—operations which it is very probable the painters were obliged to engage in personally at those periods, when the fabrication of the materials requisite for the practice of the art did not form, as in our days, a lucrative branch of industry.

In his "*Traité de Peinture*," Leonardo da Vinci makes no mention of the use of varnish, except in cases where the acetate of copper (verdigris) is used. For he observes, that this colour, being a soluble salt, it would dissolve in water whenever the picture was washed; and that is the reason he gives for covering this particular colour with varnish the moment it became dry.

In another place he proposes an unchangeable varnish for painters, to be composed of amber and nut oil, or simply of nut oil thickened by exposure to the sun.

In the above extracts there is nothing to show that Leonardo was in the habit of mixing varnish with his colours; but one of the most ancient authors, who has technically described the process of painting (*Armenini de Faenza*), and who lived towards the middle of the sixteenth century, leaves no doubt as to the use of varnish. He strongly advises that it should be mixed not only with the colours used for glazing, but also in those of the general painting. He says,

"After the first painting is completed and quite dry, then commences the operation of retouching and finishing each part with precision; for this purpose the finest and best ground colours must be used,

being prepared quite fresh, as they are wanted. For in this stage of the work, it is usual to glaze the flesh tints, instead of using solid painting with these parts, which have already received a certain degree of finishing. To facilitate the execution of the work, that part of it which is to be repainted must be lightly rubbed with the fingers dipped in fine nut oil; the work is then to be carefully wiped with silk or linen, to take away all that can be thus removed of the oil, which, if allowed to remain, would be detrimental, as it has a decided tendency to give, in time, a yellow tone to the picture. This preparation very much facilitates the work, in causing the fresh colours to glide freely over the surface, whereby the most difficult parts of it may be completed with care. Artists of experience employ but few colours in this stage of the business; glazing the parts lightly, instead of using solid colour. In this way they can obtain much softness and sweetness of tone in the flesh tints and draperies.

"I now revert to the draperies s they are glazed in the ordinary way, though skilful painters dislike this mode, because they do not desire to see the stuffs made of one uniform tint throughout.

"In operating upon a green drapery, the process we have hinted at is managed in this way. After

having laid on the dead colour with green, black, and white, in a full and firm manner, some common varnish is then incorporated with yellow lake and verdigris. With this mixture the parts prepared are glazed with a large tool. The same process is used for crimson, yellow, or other drapery,—only mixing the appropriate colours with the varnish[1]."

[1] Ma finite che sono tutte le bozze e quelle rascinte: s'incomincia di nuovo poi con far più da senno con finissimi colori lavorando ogni cosa, e tutta viu di quelli facendo le mestiche mentre si lavora a poco a poco; perchiochè questa volta più presto si vela che coprano le cose le quali sono gia condotti bene al segno e specialmente le carni e perche egli vi riesca bene si deve prima ungere quel luogo, quando recuoprir si vuole, con oglio di noce che sia ben chiaro, sottile, nel quale se li bagna dentro due dita e di subito si pone sù quel luogo e caleavisi la pianta della mano col spargerlo ugualmente per quello spazio; il che fatto si netta con pezzette di panno lino, perchè quando riman mal netto s'ingialliscon i colori con tempo; e questo porge tal ajuto che egli fa scorrere sottilmente ogni tinta o mestica che se li pou sopra senza, schiffar punto sieche ogni cosa difficile con facilita si esprime. Quivi gli esperti adoperano le loro mestiche con gran sparmio, auzi (come si e detto) non coprendo ma velaudo sottilmente quel che è sotto ne fan rimaner dolcissime e morbide le carni e i panni.

Ma ritorno a i panni che à velare si usano se bene e valenti clo sprezzano perchè troppo gli offende il vederli di un color solo, noudimmo non li vogliamo losciar indietro.

Se il panno si ha da far verde il modo predetto sarà che dopo che non verde negro e bianco si sarà bozzato, che sia alquanto crudetto, si giunge poi con verderame un poco di vernice commune e di giallo santo e cosi accompagnato si vien velando tutto ugualmente con un penello grosso di vajo. . . . Ma se sarà di lacca, si tien con quello il medisimo stile mettendovi dentro della predetta vernice: e cosi si dee fare d'ogni altro quando si è per velarli.

Armenini afterwards describes the method of preparing different varnishes.

The uses of varnish are likewise pointed out by G. de Lairesse in his Treatise on Painting. He describes how to paint upon the dead colour of a picture; he tells us that the part intended for repainting should be first moistened slightly by a couch of mastic varnish, mixed with thick oil clarified in the sun.

If the earlier authors have not afforded us more details as to the technical modes of the art, it must be attributed to the various modifications which the process was liable to, from the moment it came into practical use, as it was known at first only to a small number of artists, who kept it to themselves. Others, who were not acquainted with it, sought to find it out; and we must admit that they had much difficulty in this respect. The process of painting houses, wood-work, and even statues, was known for several centuries. The methods of making oil varnish was known, as also the volatile oils, by distillation. By these last they were enabled to render fluid the most viscous oils: nothing, therefore, remained to be done, but to discover a mode of giving a more drying quality to the oils, to counteract the effects of certain colours, which are very

deficient in that quality. Of this we should be fully aware; and even in acquiring afterwards the knowledge of Van Eyck's process, we should be convinced that this mode had been simplified.

The most certain way of recovering the primitive process, is doubtless that of examining with attention the earliest pictures in oil, and by consulting persons who are habitually engaged in restoring them. We learn from these researches, that the colour of those pictures which belong to the first epoch of oil painting, are mostly of a harder body than those of a later date; that they resist dissolvents much better; and that, if rubbed with a file, they show underneath a shining appearance, resembling that of a picture painted in varnish. It is easy to ascertain the truth of these observations; and when there is no longer any doubt on this point, we may fairly conclude that the colours of those pictures have not been simply used with pure oil, as those of our days, but with a mixture of varnish, of which some would be found to be of that description which we call "hard varnish."

By far the greater number of pictures painted from the beginning to the end of the sixteenth century are painted on wood; their panels are primed with a couch of prepared plaster of Paris, well

ground, and incorporated with animal gluten,—a preparation similar to that used by wood-gilders. This surface was then brushed over with boiled oil, to prevent the very rapid absorption of the colours, an accident which would impede the free motion of the pencils, and render the working of them more difficult.

There is, at Florence, a picture by Leonardo da Vinci, and also another by Fra Bartolomeo, which are merely dead-coloured; the outlines are drawn with the pencil, and the shadows afterwards washed in, like a drawing in bistre, with a brown colour, which is found to be bitumen. The method of laying in the picture with a kind of wash of a single tint was, I have no doubt, the practice of Van Eyck, as it was constantly followed by the chief painters of the Roman and Florentine schools,—P. Perugino, Raffael, da Vinci, and F. Bartolomeo; and entirely by the school of the Low Countries, where their primitive method would most likely be preserved for a long period.

This method, which habituates the eye to transparency, and seems on that account more agreeable to colourists, was not yet practised in the Venetian school, except, perhaps, by the first of them who commenced painting in oil.

Titian, and his immediate followers, laid in their

pictures with a body of solid colour. They had, no doubt, ascertained that they could obtain the same degree of transparency by glazing upon their work afterwards. This method also gave them the advantage of making all the changes that might suggest themselves as they proceeded. Corregio, and the painters of his school, also commenced their pictures with a full body of colour, and often in a gray tone of simple black and white.

Those who adopted this method were rather careless as to grounds upon which they painted. There are, for instance, many pictures of Titian painted upon a red ground; generally, they are painted upon distemper grounds, made of plaster of Paris and glue.

We have no doubt that the art of glazing was practised from the commencement of painting. As soon as colours came into use, it must have been perceived that the deepest tints applied in thin glazes, upon those of the brightest tone, produced a new series of tints, which could not be matched by any combination of opaque colours. Even in distemper, glazing was practised: but in oil this art was much more easy; for in the latter there is no danger of disturbing the ground upon which the glaze is laid.

The extensive use made of glazing by the Flemish and Venetian schools would go far to prove that they employed a great deal of varnish with their colours. This glazing is remarkable for the uniformity of its tint, and is scarcely observable, except upon close inspection; but it would be quite impossible to produce the same effect with colours incorporated with our drying oils.

Titian, Corregio, and F. Bartolomeo, are the painters who have made the greatest use of glazing. I have not yet seen a picture of Titian which is not glazed from one end to the other, even in the brightest parts; and if occasionally we see some parts without it, yet upon a close inspection we shall find that it is because the glaze has been carried off in the cleaning.

Yet we should be awake to the inconveniences resulting from an excessive use of glazing, or from its being done improperly. For it does sometimes happen, that pictures which come from the easel with great brilliancy, become quite altered in a few years: this was not overlooked by the colourists of the second age. They only glazed those parts which, from their natural colour and tone, had nothing to fear from the bistre-like tint which they must acquire in time.

Thus Titian and P. Veronese laid in their pictures with solid colour, and very often painted on cloth primed in distemper; but in the latter case they laid their sketches on with water-colours.

This very expeditious process, which ought to lead from distemper to oil painting, is described by Leonardo da Vinci. I have seen several pictures produced in this manner, which evidently belong to the period when painting in distemper had, in some degree, been given up. I am astonished that no person of our school has ever tried this method; but I shall endeavour to show the advantages derivable from it.

If the methods used by Van Eyck have been in some measure preserved without alteration, it is, doubtless, in that school of which he was the founder, that we must expect to find them. Otho Venius followed this process two centuries after Van Eyck's time, and transmitted it to Rubens, who practised it without alteration, as would appear from the pictures of both these artists shewing the same transparency, and the same tints, arranged in similar order. The great superiority of the execution in the works of this painter is purely owing to the superiority of his genius.

Rubens painted most commonly upon panels pre-

pared in distemper, similar to those of the old Italian masters; sometimes also, but rarely, he used cloths primed with a light gray ground of oil colour. The pictures of the Luxembourg Gallery are treated in this manner.

There is a great number of sketches by this master, in which the process described may be distinctly traced.

The figures being first sketched with black lead, are afterwards gone over with the hair pencil, and the effect is made out by a wash of a brownish colour, of the same kind that is observable in the unfinished pictures already described of Leonardo da Vinci and F. Bartolomeo.

The lines formed by the colour are fine, yet full of colour; their perfect continuity proves that the pencil flowed freely on the surface; the ridges formed by the brush are not effaced; and full touches of transparent colour, though very liquid, have kept their situations.

Doubtless it is easy enough to make the pencil flow freely upon a smooth surface lightly moistened with oil, and the finest lines may be traced thereon; but they are no sooner formed than their neatness is gone. If we employ liquid transparent

colours, they do not remain an instant: as we have applied them, the oil separates, and in a short time the lines become more or less indistinct.

Rubens has often painted a picture off at once upon very smooth panels. He used very little colour in the shadows, or even in the half-tints; it is in the light parts only that we find touches of solid colour.

If, with the colours now in use, we should attempt to paint a picture up at once upon a similar ground, we should soon find ourselves stopped by an insurmountable difficulty. The colour would glide over a surface too fine to retain it; a second attempt would obliterate the first; and we should very soon discover the necessity of beginning with a slight dead colour, and of substituting, for the smooth surface, one somewhat granular, and retentive of the colour.

If, by way of explaining the various materials employed, we should suppose that Rubens used very soft and free pencils,—therefore more fit to lay on the colours, and cause them to retain their situation,—this will not explain why it is that the oil never separated itself from the most liquid part of the colour. We must, therefore, admit that

Rubens did not paint with colours prepared as ours are, but that he rubbed the surface of his panel with an unctuous substance, which was sufficiently liquid to allow the free movement of the pencil, and at the same time to make the colour adhere to the surface, as well as to prevent the tendency which some of them have to spread farther than they ought to do.

I have stated that Rubens preserved unaltered the process which he had learned from his master. Yet, when in Italy, he adopted the method of Corregio; painting, like him, every part of his picture with a full body of colour, afterwards merely glazing the shadows, the darkest parts, and the draperies. But on his return home he soon resumed the transparent manner of his master.

Jacob Jordaens did not commence painting under Rubens; and his method of dead colouring was not like that of the latter, composed of light washes: but his colour is so brilliant and so transparent, that it is not to be doubted he made use of varnish.

Van Dyke, who had at first adhered to the manner of Rubens, and had even gone beyond him in the extravagant use of cinabar, changed his process and his colouring when in Italy: he painted

with a full body of colour, like Titian; but was more cautious in the use of glazing [1].

After having, like his master, made an inordinate use of vermillion, he abandoned it for a system of colouring less brilliant, but more true to nature,—arising, probably, from his painting so many portraits, which brought nature constantly before him. As he had some experimental knowledge of chemistry, he found that the elements of cinabar were not favourable to its stability; consequently he used it but seldom. It is probable, also, that he recommended to his pupils to be sparing of its application, as they would find in the Venetian red, the brightest tints of the most brilliant carnations. P. Tyssens, one of the most skilful artists of this school, never made use of cinabar; and a pupil of the latter exceeded his master's instructions so much, that his pictures present little else except a grayish tone.

Apparently nothing can be more remote from the process used by Van Eyck than that of Rembrandt, yet he followed that method in his earlier works; but the vivacity and strength of his ima-

[1] I remember having seen, in the Altieri Palace at Rome a picture by Van Dyke, in which could be clearly traced the transition in the manner of this pupil of Rubens, from that of his master, to follow that of Titian.

gination made him abandon it, as he no longer attached any importance to the executive part. Impatient to realize the fine effects that presented themselves to his imagination, this made him rather careless in the application of his colours: whatever he found on his palette, he turned into use. Then it was that he often used muddy and opaque tints for those that were brilliant and transparent; but he had too fine and just a sentiment of colouring to admit of his looking upon this species of art but for a brief period, and his first care in making up his palette, no doubt, was to restore the lost transparency by glazing. It is really surprising that a school like this, in which the executive part was not valued, should produce an artist (G. Dow) who looked upon that quality as very essential. The pupils adopted the later manner of their master, which was less careful than the first. In this respect Gerard Dow was an exception, which we cannot account for sufficiently by attributing it to the patient character of that artist, and the slowness of his imagination; but our surprise will be diminished when we find, that when Dow entered the atelier of Rembrandt, the latter had only begun to be admired, and his works at that time were executed with remarkable care.

It seems to be the fate of the arts, that their decadence begins immediately after they have attained near to perfection. This destiny had been already, in great part, accomplished in Italy, when the chief founder of the French school, Simon Vouet, went thither to study the great masters. Even the traditionary accounts of their process had either been lost, or had been so corrupted, that the practitioners, who had constantly before their eyes the *chefs-d'ouvres* of Titian, of Raffaele, and Corregio, were prodigal of their applause to Joseph Arpino. The greater number of pictures painted at this time were in fresco, and were done from memory, after drawings more or less finished. The result of this was, that the artists contracted the habit of painting their easel pictures after a similar fashion, and were no longer capable of painting from nature. By this vicious practice, each painter adopted, without perceiving it, certain forms and tints, which they constantly reproduced, until all their figures appeared as if done from the same model.

Such was the state of the arts at the time that Vouet received his education. It is reasonable to suppose that this state of things should have a great influence upon the French school: the style of Vouet has more of elegance than elevation; he treated

history in a more agreeable and just manner than several of his contemporaries, who enjoyed much celebrity in Italy. He was not a colourist; the numerous pupils of his school were never distinguished for that quality, which he himself did not possess. Our historical painters then constantly worked from designs: the only imitators of nature were those who painted portraits, animals, or scenes of familiar life; and it is in this class alone that we can reckon any colourists. If against this assertion, the names of Blanchard, P. de Champagne, and La Fosse should be mentioned, it may be answered, that the first studied a long time at Venice, and the second was educated in the Flemish school, which was formed by masters who must have preserved the traditionary account of Rubens' methods; and, finally, that La Fosse is far from being considered a fine colourist. Perhaps he would have carried this seductive part of the art to a high degree of improvement, if he had been obliged, like Rigaud and Largilliere, to paint portraits, or, like Despontes, animals, or Vandermeulen, landscapes and battles, or, like Watteau, scenes of familiar life. He would have equalled the Venetians and Flemings, with whose methods he was well ac-

quainted, if he had been obliged to apply himself constantly to the study of nature.

It is, therefore, to the established practice of our school,—"painting from drawings,"—that we may attribute the want of success in colouring which has attended the efforts of our historical painters. Le Brun was not ignorant of the methods employed by the colourists; he understood how to increase, by glazing, the brilliancy and transparency of colours. His pictures display many specimens of fine colouring; and I have no doubt whatever, but that he would have been ranked amongst the colourists if he had painted from nature.

Whenever the artists cease to take nature for their model, the art itself follows a downward career with a frightful rapidity, that soon brings it to decay, and at last a time arrives when the faithful representations of nature are looked down upon as being *incompatible with genius.*

Under this morbid influence, success can only be obtained by a mean submission to the arbitrary dictates of bad taste. Then, and for so unworthy a motive, it is that the limits of good taste are invaded by sweeping forms, that well may be called *hyperbolic* curves, with broken lines and different

surfaces united by extravagant touches; and the execution of the work is pretended to display so much more knowledge in proportion as it diverges farthest from the truth. This is not an exaggeration. Cochin, in his eulogy on the works of Chardin, boasts particularly of that sort of execution, whilst he says,—"Painting being an art, that art is carried as much nearer perfection as the means of the artist appear turned from their legitimate object!"

Such was the doctrine acknowledged in the French school when Greuze came forward. Brought up under Restout, who taught his pupils that a globe ought to be represented as a polyhedron, Greuze most implicitly adopted that doctrine, and in practice showed that he considered the round cheeks of a young girl, or of infants, as bodies cut into facettes. Yet he has proved decidedly, that with a constancy the most imperturbable, and by never losing sight of the object which he would attain, the artist will at length succeed, whatever roundabout methods he may adopt. It is easy to conceive the possibility of forming a sphere from a cube, by cutting off its angles indefinitively; but this is certainly a very tedious method of proceeding.

Greuze far surpassed all his contemporaries in the science of colouring, and may be ranked among

those who have materially assisted in restoring the character of the French school, by bringing back the art to its true basis,—"the careful study of nature."

The following detail of his method is given upon the authority of one who was well acquainted with it. He always, in painting a head, laid it in first with a full body of colour. Afterwards, when he would repaint upon this dead colour, he began by glazing it entirely, and then got in his effect with transparent colours combined with a strong unctuous vehicle, by means of which his pictures dried without absorption. After this preparation, which he carried on rapidly, he entirely repainted the head, commencing by the lights, and going progressively to the shadows. But as he did not possess great facility, he could not finish his work in the second operation; therefore it still appeared only in an advanced state of dead colour. Sometimes he could not get it to his liking for several sittings; but at last, by following the same mode of operations, he was enabled to produce a work, in which we admire the colouring, without perceiving any traces of the labour by which it was produced.

Sir Joshua Reynolds, who was contemporary

with Greuze, was the greatest colourist of his time, and the influence of his talents has in this respect given a tone to the English school. By profoundly studying the works of Rubens, Rembrandt, and Titian, he was enabled to discover the modes of operating used by these great masters, and to found his own system of execution upon theirs.

He frequently laid in his pictures like the Venetians, with a full body of colour, and sometimes with a mixture of black and white; he afterwards laid on his colours, and made out his effect with glazing. When this was dry, he repainted it with solid colours, and always finished with glazing. In this way I have seen one of his pupils paint in Italy; and, with respect to the colour of his work, nothing could be more agreeable.

Sir Joshua painted with varnishes, and tried a great variety of them: it is much to be regretted that he has not left any notes on this subject. The greater part of his pictures had a most brilliant effect when they came fresh from the easel, but several of them have lost their charming tones—some have faded even in a few years; others have changed to a greyish tone in consequence of the absorption of the glazing by the solid colour on which they were

laid; many parts have faded from the action of the light and air, and some have become brown from the oils and varnishes used having been badly prepared. Like P. Veronese, he has often painted on distemper grounds. There is at Paris[1] one of his finest portraits, painted on such a ground. At the back of the canvass, and exactly behind the face and head, there is a couch of white and size, which has been applied to absorb the redundant oil, which would have remained in that work, from its having been repainted several times without allowing it each time to become quite dry.

Mengs also used a mixture of varnish with his colours; and I understand that his method is still very generally practised at Dresden. Among the modern painters I could mention many others, to show the advantages derivable from the proper combination of varnish with the colour, but I prefer returning to the older masters who have followed the process of Van Eyck; and I shall add, that any artist, by an attentive examination of the pictures belonging to the first period of oil painting, may

[1] In the possession of the Prince de Broglio: it is the portrait of "the Marquis of Granby."

convince himself that some of the Italians have employed oil varnish of a harder description than that used by the Flemings, for it offers a stronger resistance to solvents.[1]

We find in Theophilus and Armenini receipts for the preparation of varnish. The first especially has particularly detailed the preparation of an excellent hard varnish, which has been employed in the early times of art, for it was known some centuries before painting in distemper was abandoned; but, independent of this circumstance, the great point is to show that they mixed their colour with varnish. Our chemical knowledge, and the advancement made in the preparation of varnish for several years past, justify our belief that it can now be made as fine as any that ever was in use.

Those who use it at the present time, either on pictures, or generally in painting, are not in possession of a method by which it can be employed in the colours without inconvenience; varnish owing as it does

[1] I have had occasion to examine closely the fine picture by Giorgione which is in the Museum, No. 1011. This work is drawn into wrinkles in several places, which proves that the artist employed an oil varnish, for it is the constant effect of this vehicle to run into wrinkles in drying.

its fluidity to the essential oil of turpentine, which evaporating quickly, the colours become so clammy that they quite impede the movement of the pencil. Varnish intended to be used with colours, ought not to dry more rapidly than the oil in which they are ground; and, in place of adding difficulties to the executive process, should give it greater facilities. The latter qualities are to be found combined in a substance, of which the invention has been gratuitously attributed to me. I have found it employed in Italy; and as no person can account for its invention, I presume that it must be very ancient. It resembles honey in consistency, and is named *oglio cotto* (baked oil): it is merely nut oil, baked before a slow fire, and holding in solution as much litharge as it will retain. In using this preparation, the usual method is to mix it with common varnish; this produces a sort of pommade, in which is combined the greater part of the qualities required in varnish which is to be used with colour. This varnish flows under the pencil like oil, and yet on the palette it holds its place like the colours. This quality is valuable for transparency: no matter how liquid the colours may be that are made by this mixture, they can be freely used, without

the danger of separating or spreading beyond the spot where they are placed by the pencil;—superior in this respect to asphaltum, which, whether it be dissolved in drying oil or oil of turpentine, is equally clammy and intractable, for it is impossible to keep it on the palette, or yet to spread it sufficiently thin upon any part of the picture, without its running beyond the bounds required; but when mixed with this varnish, that tendency is prevented, and it becomes as manageable as the other colours. With this oglio cotto, which is a true varnish, the imitation of Rubens' sketches presents little difficulty; though this cannot be managed by our ordinary materials. Whenever this oil loses its fluidity, it is owing to the varnish with which it must be combined; for the volatile oil of the latter constantly evaporates, and the colour becoming too thick for use, restrains the freedom of the pencil. It is therefore only useful to those who work with great rapidity, or for the purpose of glazing, which does not require much time.

There is another preparation which, I believe, was employed in the school of Flanders, and has not the disadvantage of rendering the colour clammy in a short time. It is composed of mastic in grains, and fine wax, dissolved together in white drying

oil. *Prudhon*, a man whose loss is still regretted by the friends of art, used it constantly;[1] and it is not to the use of the medium that we can attribute the cracks that have ruined some of his pictures: they would all have been preserved, like his Psyche, his Zephyrus, and many others, if care had been taken not to varnish them until they were perfectly dry.

From the small quantity of wax added to the mastic, this varnish resembles one of those described by *Armenini*.[2] In the varnish used by

[1] In the latter years of his life he gave the preference to the varnish of Theophilus, the preparation of which will be described in the chapter on varnishes.

[2] . . . . Alcuni dunque pigliavano del oglio d' abezzo chiaro, e lo facevano disfare in un pignattino a lento fuoco, e disfatto bene, li ponevano tanto altro, oglio di sasso, gettandovelo dentro subito che essi lo levavano dal fuoco, mesticando con la mano cosi caldo, lo stendevano sopra il lavoro prima posto al sole, e alquanto caldo, sicche toccavano con quella da per tutto egualmente; e questa vernice e tenuta la piu sottile, e piu lustra d' ogni altra che si fania; io ho veduto usarla cosi per tutta la Lombardia da i piu valenti; e mi fu detto che cosi era quella adoprata dal Corregio e dal Parmegiano nelle sue opere, se si può credere a quelli che li furono discepoli.

Altri sono che pigliano *mastice che sia bianco et lustro, e lo mettono in un pignattino al fuoco, e con esso vi mettono tanto oglio di noce chiaro che lo cuopra bene, e cosi lo lasciano disfare, tutta vià mesticando lo assai; di poi lo colano con una pezza di lino rada in un altro vasetto, e questa suol venir piu lustra se vi, si getta dentro fin che bolle un poco di allume de roccha abbrugiato e tutto in polvere sottile,* e di questa se ne può mettere negli azzuri fini, nelle lacche e in

Mengs, mastic is also the chief ingredient. That the brightness of colours is greatly augmented by

altri tali colori acciò si aschiugino più presto... Altri ancora pigliano tanto mastice quanto sandaracha, e ne fanno sottilissime polveri e le coprono con oglio di noce al fuoco nel modo delle altre de sopra, la qual poi collata vi aggiungono un terzo di oglio di abbezzo e lo incorporano con quelle ma vuol bollir poco, perchè la vernice verrebbe viscosa: e tutte queste predette vernici, mentre si fanno disfare al fuoco, si mesticano sempre con una piccola bachetta, le quale poi coperte nel suo vasetto, si conservano longo tempo, con farsi più purgate, et sottili.

TRANSLATION.—Some painters (says Armenini) prepare their varnish by placing a portion of transparent turpentine (that of the fir-deal) in a vessel, and exposing it to the action of a slow fire; when quite liquified, they mix it well together; then it is taken off the fire, and an equal quantity of petrolium (rock oil) is added; these being well incorporated, the liquid is applied to the picture, which has previously been warmed by the sun's heat. Of all the species of varnish, this is considered the lightest and most brilliant. I have seen it used all through Lombardy, and, if we credit the reports of Corregio's and Parmegiano's pupils, it was employed by those two great masters.

Other Artists used white and clear drop mastic for this purpose: they poured upon a quantity of this gum sufficient nut oil just to cover it, then they kept stirring it over a slow heat until it dissolved, and finished by straining it through a piece of smooth cloth. This varnish acquires a greater degree of transparency and brightness, if when it has commenced to boil, a little calcined alum is added to it finely powdered. This preparation may be used with ultramarine, the lakes, and all that class of colours, as it causes them to dry very quickly.

Another method employed, is to take equal parts of mastic and gum sandarac, and dissolve them in nut oil, as described in the preceding process; when ready, one-third of their bulk of fine turpentine is to be added; after this the boiling must not be continued a long time, because the varnish would otherwise become too

varnish is allowed by all painters, but it is found that this advantage is only gained at the expense of the solidity of the colouring, which fades in time; for to its injudicious use is attributed the cracks that appear often in pictures, and which sooner or later occasions their destruction. I have already observed, that the cracks are not always consequent on the use of varnish, but are attributable to other causes which we may control. It is not uncommon to see pictures cracked throughout their surface, although there has not been any varnish employed in their execution: this accident always happens when we employ in succession several couches of thick varnish upon a picture, of which the surface only has been allowed to dry, and perhaps also the varnish is of bad quality.

Several manufacturers of that article, wishing to realize a great profit, do not put in a proportion of mastic sufficient to render it brilliant; they often substitute the strong oil of turpentine, which is much cheaper, and produces for the instant a similar effect, but varnish prepared in this way soon

thick and clammy. In all these operations, great care must be taken to keep the mixtures constantly stirring with a spatula. These varnishes, when safely kept from the air in proper vessels, become very clear, and acquire by time a finer quality and better substance.

loses its transparency, it dries only on the upper part, a portion of it penetrating under the surface of the colours softens them, and the picture is soon covered with cracks: these accidents happen whenever a couch of colour not dry underneath, is covered by one of a thin consistency completely dry; the soft portion dilates itself when the temperature is raised to a certain height, and the upper surface, not having the power to resist or to follow the expansion of that underneath, becomes soon cracked on the surface, the moment it is exposed to any ordinary heat.[1]

From these observations we must conclude, that it is highly improper to varnish pictures until they are completely dry.

That the proper use of varnish is not the cause of the picture becoming cracked is very evident: this injury arises from the varnish having been badly manufactured or improperly applied; this is proved by the vast number of varnished paintings that re-

[1] These cracks or gashes are very rarely to be met with in Titian's pictures, yet we do find them in his work *The Crowning with thorns.* They are observable in a place where this Artist has repainted, with a full pencil, upon a part of the picture which had a strong couch of bitumen previously laid on, and which had only dried on the surface.

main without any alteration, and also our coaches, and the numerous objects in japanned works which are exposed to every sort of temperature.

In considering simply what constitutes the true manner of each school, and of the several masters, so far as regards merely their technical process, we perceive that the entire code may be reduced to two points, viz. *transparent*, and *opaque* painting. The former, a most important quality in colouring, has been particularly attended to by the ancient Artists. To gain this essential object, some painters have laid in their pictures with thin washes, and have used but little colour; others have commenced with solid painting, and then finished by glazing, which method has produced the most transparent effects; and thus by different modes obtaining similar results; for we find that the solid paintings of Titian and Rembrandt are equally transparent with those of Fra Bartolomeo and the Bronzini.

The changes which are observable in many pictures, from their original lustre to a yellowish tone, afterwards caused many Artists to give up the advantages of transparency.

Sasso Ferrato is an example of this feeling in

the seventeenth century,[1] and the French school followed the same course towards the middle of the following age.

In this essay, I think it is sufficiently proved, that the brothers Van Eyck, and the Artists who adopted their methods, used varnish in their painting, and this it was which brought forth all the brightness of their colours, and preserved their works from the injurious action of the atmosphere.

This process, which the inventor only transmitted at first as a secret to a select number of practitioners, and unfortunately, not being committed to writing, soon became impaired, and was at last reduced to the mere use of plain drying oils, a method which some schools still practise.

That the process employed by the Van Eycks, whenever or with whomsoever it may have originated, is less liable to change, than any other known method, is quite evident, and that we may consider it certain, that Rubens adopted it with great advantage to his works; for one thing is quite clear, which is, that there are many parts of his works which cannot be faithfully imitated by any of our common methods of painting; yet when we make

[1] Sasso Ferrato (Gio. Batista Salvida), born in 1605, died in 1685.

use of a vehicle in which varnish is an ingredient, these difficulties can be overcome.

But experience alone must determine, whether my observations are just, and if so, how far they may be useful. I shall now proceed to describe the composition of the varnishes, with which the colours may be prepared, in a similar manner to those originally used in the Flemish and Venetian schools.

CHAPTER II.

THE VARNISHES.

EVERY substance may be considered as a varnish, which, when applied to the surface of a solid body, gives it a permanent lustre. Drying oil, thickened by exposure to the sun's heat or a fire, is a varnish, and as such has often been employed. It is, however, probable that varnishes, composed of resins dissolved in oil, have been used in very ancient times.

But it is beyond all doubt, that when the arts flourished in Greece, the composition of varnish had long been known in India, Persia, and China. It is not then to be supposed that the Greeks were unacquainted with this art. Yet such would have been the case if we give credit to a paragraph in Pliny, who tells us that Apelles was indebted for his unequalled colouring to the employment of a

liquid which he calls "Atramentum," with which he covered his pictures when they were finished, and with which substance no other painter was acquainted. Pliny observes, "that there is in the pictures of Apelles a certain effect, that cannot be equalled, and that tone was obtained by means of *atramentum*, which fluid he passed over his pictures when the painting was completely finished. This liquid, we are told, brought out all the brightness and fulness of the colours, and also prevented the dust, or other similar substances, from impairing their lustre. It was so transparent, that it was not perceptible until you were very near to it. One of its greatest advantages was, that the brightest colours, under its influence, so far from dazzling the sight, seemed as if viewed from a distance, or through a glassy medium, which imperceptibly lowered the tone of the most brilliant tints, rendering them more chaste and agreeable to the eye.[1]"

Sir J. Reynolds believed that he saw in this ar-

[1] Unum imitari nemo potuit, quod absoluta opera *atramento* illinebat, ita tenui, ut idipsum repercussu claritates colorum excitaret, custodiretque a pulvere et sordibus: ad manum intuenti demum appareret, sed et tùm ratione magna, ne colorum claritas oculorum aciem offenderet, veluti per lapidem specularem intuentibus è longinquo, et eadem res nimis floridis coloribus austeritatem occultè daret.—Pliny's Natural History, Book xxv. chap. 10.

ticle a description of the process of that plan of glazing, to which he owed, in a great measure, his admirable system of colouring.[1] This glazing augmented the brilliant effect of the colours, whilst, at the same time, they were brought more into harmony, and rendered more pleasing to the eye. But this was not done with any liquid of a uniform tint; neither did it prevent the pictures from being injured by the dust; for Pliny positively declares, that no other painter could produce the same effect of colour which Apelles obtained by the assistance of a transparent liquid, supposed to be of a brownish tint, as the term *atramentum*[2] would imply; and that this liquid, when applied to coloured pictures, completely secured them against whatever might in any way soil or discolour them; and this can only be understood as applying to varnish.

[1] Refer to the note 37 on the poem of Dufresnoy, printed at the end of his discourses.

[2] The term *atramentum* is frequently used by Pliny as expressive of the fluid and carbonaceous matter of which that substance was composed. From this it would appear, that not having an exact technical term for it, he had adopted one, of which the general signification meant to describe a liquor of a brownish appearance.

Copal varnish has this tone: it appears so, at least, when it is in the large vessels; and, when applied in thin couches, it is so equally transparent, that it does not communicate any colour to the most delicate picture to which it may be applied.

Reynolds, in adopting that meaning of the above passage, probably did so because he could not believe that the Greek painters were unacquainted with the art of making varnish, which for a long time previously had been used in the eastern countries. He rather supposed that Pliny had not well described, or clearly understood, the method of Apelles. However this may be, even admitting that Apelles had known only the preparation and the use of varnish, it is rational to suppose, that some time latter (suppose in the time of the lower empire) it was no secret to any Greek artist; and probably from them the Italians became acquainted with it, along with the elemental principles of painting. In the works of Theophilus, already quoted, we find a method of preparing an oil varnish very well described. The process is remarkable for being the same that is used at the present day for the same sort of varnish, with merely this difference, that the varnish of Theophilus is only a simple solution of resin in pure linseed oil, without the addition of any essential oil to render it more fluid. In fact, at that time it could not have been otherwise; for the art of distillation, by which the essential oils are prepared, was not known.

The varnishes have been arranged in three classes,

viz. spirit of wine, (alcohol,) spirit of turpentine, and oil varnish, called "strong," or hard varnish. Alcohol varnish not being used in oil painting, it would be superfluous to describe its preparation, which, besides, does not differ in the process of making from that made with oil of turpentine, but simply in the nature of the resins of which it is composed.

I shall not take up the reader's time, except upon those sorts of varnish which belong to painting in oil, and either used for mixing with the colours, or employed in covering the surface of the painting when dry. But previous to showing the modes of preparing them, it is but proper that I should describe the materials of which they are composed,—such as the bitumens and resins which form their bases, and the oils in which they are dissolved :—

SECTION I.

SUBSTANCES WHICH ENTER INTO THE COMPOSITION OF VARNISH.

BITUMENS.

These substances, which are unctuous and inflammable, are dug out of the earth, and in many respects resemble the resins so strongly, that one

might well suspect them of a common origin. Of these, only asphaltum and amber are used in painting.

ASPHALTUM.

This substance is a mineral pitch, of a very rich brown colour, hard and brittle, forming compact masses. It has a bright glossy fracture, and is easily soluble in oil of turpentine, and in the drying oils. It then affords a very brown and transparent varnish, but very viscous, and with such a tendency to flow off the palette, that it can hardly be used, unless when mixed with some of the other substances to correct this disadvantage, and fix it in its position.[1]

AMBER.

Yellow amber, called also carabé, or succin, is classed among the resins, because it is found in the earth; yet it evidently has a vegetable origin. In fact, the forms of the larger pieces clearly indicate a substance that has been liquid and flowing, similar to the resins; and we sometimes find pieces of it in which insects are enclosed, and these incidents could only have originated when the amber was in a fluid state.

[1] Vide the articles on browns, in the Chapter on the preparation of colours.

Amber is sometimes opaque, but often as transparent as glass; its colour, different shades of yellow: it grows darker by exposure to the air; very old works in amber being brown, whilst those of a recent date are of a bright yellow tone.

Amber differs essentially from all the other resins, not only by its superior hardness, which admits of its being cut into various ornaments, but also in its evolving on fusion a volatile acid (*succinic*), which flies up to the top of the receiver.

Amber cannot be fused except at a higher temperature than that used to dissolve copal. Amber varnish is, of course, very brown, and can only be employed with dark colours, to increase their strength and transparency: the umbers, for instance; the oxide of manganese; and all the brown drying colours.[1]

RESINS.

These substances, like the bitumens, are either hard or of a thick consistency; are very inflammable, insoluble in water, but more or less so in alcohol,

[1] In the earliest of the Italian receipts, the carabé, or amber, is placed amongst the materials which enter into the composition of varnish. It is possible, however, that they may have confounded the carabé with the copal, which is more fusible.

æther, or the oils. With the exception of lac, which, like wax, is an animal substance, the resins flow spontaneously from certain trees, and form a viscous juice, which grows thicker and harder on exposure to the air.

Of resinous substances, we find a great number which do not relate to our subject. I shall, therefore, confine my attention to those which are proper for the making of varnish.

GUM ANIMÉE.

Under this name we find resins which do not belong to the same tree. The true gum animée flows from the courbaril tree. In clearness it resembles copal, but it is whiter and more brittle; yet it will not dissolve in oil of a temperature much lower than that gum, and it is so coloured that there is no advantage derived from employing it in place of copal. It will dissolve in oil of turpentine, but the solution is muddy; it will become clear in time by depositing the insoluble matter which remained in a state of suspension.

GUM COPAL.

This is the most brilliant and the hardest of the resins. There are two species of it; one which flows

from a tree (the *eleocarpus copalliferus* of *Jussieu*, and denominated by *Linnæus urateria Indica*); the other kind is imported from Spanish America, and is a species of the shumac (*rhus copallinum*). Besides these two sorts, we find, in the copal of commerce, certain portions which are nearly the same in appearance, but are fusible at a much lower degree of heat.[1] The varnish-makers pretend to discover them by their globular forms and superior whiteness. But the difference becomes evident between these two kinds in a preliminary operation, which the copal must undergo to disengage it from an opaque crust, arising probably from the action of water and the atmosphere. Formerly this crust was scraped off with a knife: the present mode of removing it is to steep the gum for two days in a strong lye; it must then be washed, and dried perfectly, and when broken up, this impurity evaporates in dust. During this operation, the softer particles,

[1] Reaumur, who has made many experiments in the manufacturing of varnishes, and who has succeeded in dissolving copal in alcohol and in oil of spike, has remarked that in the copal of commerce all the pieces are not equally soluble. To ascertain at once the quality of these pieces previous to commencing his operations, he tried them on the heated blade of a knife, to ascertain their capability of resisting a change of colour; some parts melted more or less readily, other parts fried like gum; he rejected the last, and only used the fusible portions.

which are always few in proportion to the mass, become more soft, and adhere to whatever they touch. We therefore must be careful to put this portion by itself, to be used separately; because being more easily melted than the other part, it would dissolve first, and, by remaining in this state, too long exposed to the action of heat, it would take a reddish tinge, and thus communicate too strong a colour to the varnish.

Copal is, in general, more transparent and less coloured, though not so hard, as amber; yet it is not unlikely that copal has been cut into ornaments instead of amber.

LAC.

This material, which is incorrectly called "gum lac," is a resinous substance, produced by an insect that had long been considered a winged ant, but which the recent observations of naturalists have classed among the gall insects, like the cochineal and kermes, and thus it has been termed *coccus ficus* and *coccus lacca*. The females of this tribe collect in great numbers around the small branches of trees, to deposit their eggs, which they cover with a resinous substance: this is the lac. It is used in making varnish and sealing-wax. The eggs and

embryo of these creatures, like those of the cochineal and kermes, contain colouring matter of a complete purplish crimson.[1]

MASTIC.

This resin distils from a species of lentil tree, of which there is abundance in the isles of the Archipelago, and particularly in Scio. This gum is collected in the form of drops or roundish grains; is transparent, and of a light citron colour; is odorous, and softens so far in the mouth that it can be pierced by the tongue, and may be drawn into ribbon threads, &c. It is commonly chewed by the people in the Levant; and hence its name is derived. Nearly all of it that was collected in Scio used to be sent to the Grand Seignior, and was used in the seraglio.

Mastic will dissolve at a temperature equal to that of boiling water; but its solution in alcohol is cloudy, which shows that it is imperfectly dissolved; but in the fixed, and volatile oils, it will dissolve completely. The solution of this resin, with oil of turpentine, forms the common picture varnish.

SANDARACH.

This gum, in colour, and somewhat in its form,

[1] Vide the article "On the preparation of Indian lake."

resembles mastic; but differs much from it in other points: for instance, it will not soften in the mouth. It is very brittle, and dissolves easily in alcohol, but not in oil of turpentine. Reaumur assures us that he succeeded in dissolving it in oil of spike, after having steeped it in spirit of wine. I have not succeeded in doing so; though, in several instances, I have found the advantage of mixing alcohol with the essential oils. Sandarach will melt in the fixed oils at a low degree of heat; but to form a perfect combination, the highest heat is required: the solution is then of a brownish colour.

OILS.

There are two distinct species of oils,—one sort, viscous and greasy to the touch; all of this class are called "fixed oils;" and those of the other class, without adhesiveness, are termed "essential oils."

FIXED OR SOLID OILS.

The true nature of these oils was not known until the experiments of M. Chevreuil upon fatty substances developed their combinations.

This experienced chemist has shown that there are in these oils two distinct substances: to these he has given the names of *oleine*, and *stearine*, or

margarine. These substances, which are not acids naturally, become so when combined with metallic oxides.

With potass and soda, fixed oils form soap; oxides of lead give them a drying quality, and combine with them so far as to form a paste or unguent.

All the fixed oils are subject, in time, to become thickened by exposure to the air; but this operation is more or less active, according to the nature of the oil. Some of them, having naturally a drying tendency, will, in time, become as hard as the driest resinous substances. The linseed, nut, and poppy oils used in painting, are of this description. It is not improbable that others of this class may also possess similar properties, and might be employed in painting with the same advantage as these now in use. I have read in some work that it is possible to extract from the stones of raisins, a drying oil, said to be extremely proper to be employed in making hard varnish.

LINSEED OIL.

This oil has the fullest body, and dries better than any of the three oils in use amongst artists; its colour is a strong yellow, but this effect does not

arise from the action of the fire to which the seed is exposed in extracting the oil from it. This colour, in fact, proceeds from the pellicle which covers the grains, and which contains a strong colouring matter soluble in oil. Linseed oil, cold drawn, as used in medicine, is equally coloured with the other sort; but, like that of wax, this colour is carried off by exposure to the sun. Linseed oil is extensively employed in the manufacture of hard varnish, because it is of a more drying nature, and preserves its transparency better than the other oils.

NUT OIL.

When cold drawn, this oil has very little colour, and the common sort has even a less tinge than oil of linseed. Some give it a preference for pictures much exposed to the air; besides, it does not become so dark as linseed oil by the action of the oxide of lead.

OLIVETTE OR POPPY OIL.

This is the most colourless, but the least drying, of the three oils. As the poppy plant is much cultivated in Flanders, we may suppose that this oil has obtained a preference in the school of the Low Countries, where the poppy is in many places called the *olivette*.

Although these oils have a natural tendency to dry, yet this quality is not sufficiently strong to overcome the action of some colours which retard it in various degrees;—for instance, the lakes, bone or ivory black, and particularly the bituminous earths. But experience, from which this information is derived, has also taught us, that there is a drying power in some metallic oxides, which facilitates the preparation of oils, in a manner that quite overcomes their original difficulty in drying.

TO PREPARE DRYING OIL.

From the tendency that several of the oxides and metallized salts have to unite with oils, and thus to render them more drying, has resulted a great many different receipts for the preparation of drying oil. Some recommend sulphate of zinc, calcined verdigris, plaster of Paris, umber, oxide of manganese, &c.; others prefer putting into the oil a crust of bread and a head of garlic. But, in all these preparations, litharge is the chief ingredient. The oxide of lead having the greatest power over the oils, to recommend other substances would be superfluous.

In this process litharge, in the proportion of one-

eighth part, should be reduced to the finest powder; this condition is indispensable to its perfect solution.

The vessel containing the oil and litharge is then to be placed on a slow fire, and frequently stirred with a spatula: a considerable quantity of scum is soon formed; and the ebullition is so great at times, as to make it necessary to withdraw the vase, to prevent the oil running over.

When the scum has quite disappeared, it is a sign that the oil is in a proper state; it is then allowed to stand still; then the litharge which has not combined precipitates, and in a few hours the surface of the oil will be covered with a pellicle, which indicates that the operation is complete.

This preparation is of a brownish colour, which is increased in proportion to the time that it may have been exposed to the action of a strong fire; it becomes clear when allowed to rest, but is never colourless. By operating at a lower temperature, in a *balneum mariæ* (a water bath), or even in mixing water with the oil, and supplying its loss by evaporation, an oil less drying is obtained, but less coloured, which colour grows more faint by exposure to the light.

A drying oil nearly colourless may be obtained

by combining linseed, or nut oil with litharge, and triturating them together for a considerable time; this will produce a sort of yellowish creamy substance, which, being allowed to rest, soon becomes clear; but if there be not time to wait, this fluid may be filtered through blotting-paper; it is then transparent, but with a little colour, which soon goes off when exposed to the light.

By letting fall some of the oxide of lead, which it held in solution, this operation may be completed in a few hours. It is evident that the oil in combination with the litharge forms two distinct substances: the transparency of the first is not impaired by the oxide it contains; the other is a thick substance, a kind of soap, in which even the oil is changed, as if by the alkalies. This matter will be noticed more fully in the chapter on varnishes.

The chemical affinity of the oils and the oxide of lead is such, that they may be combined by triturating the oil with a leaden muller; the oil then assumes a gray colour, arising from the solution of the lead; this mixture being collected in a cup, the metal soon subsides, and the oil, which floats at the top, is very clear and dries better because it holds in solution a portion of the lead.

Where litharge cannot be had, lead filings and

pieces of flat lead may be put into a bottle with linseed or nut oil, and frequently shaken; in a few days this will produce an oil almost colourless, and capable of drying the lakes, as well as the ochres. As the drying oils become fat in a short time, it is best to prepare only a small quantity at once.

ESSENTIAL OILS.

This class of oils has very different qualities from the solid oils; these are thin in consistency, are caustic, odorous, and easily ignite at the near approach of any flaming substance.

OIL OF TURPENTINE.

This spirit is much used in oil painting, and in the preparation of varnish. It is prepared, by distillation, from the rough turpentine of commerce, which exudes from the pine, larch, and fir trees. When properly distilled, this essence is without colour: when it has an amber tint, it may be rendered colourless, without a new distillation, by merely mixing with it a little quick lime in powder, and shaking the vessel with the mixture for some time; the lime precipitating, carries with it the colouring matter, and when this has quite subsided, the essence will be as clear as water. To hasten the separation

of the lime is easily done, by filtering the mixture through unsized paper.

OIL OF SPIKE.

This oil is drawn, by distillation, from a large species of lavender, which is very common in the ancient province of Languedoc. It is called "aspic" in commerce. This oil is adulterated with oil of turpentine, and it is probable that even the best sort is made by distilling that essence several times with lavender or aspic flowers. Reaumur has succeeded in dissolving copal in it. This oil has more body than oil of turpentine, and from this I infer that Reaumur's varnish ought to be very durable.

ROSEMARY OIL.

It is probable that this oil is prepared as the last-mentioned oil. It has not so full a body as the spike oil, and is therefore better calculated to make varnish, and it appears to have a stronger action on copal.

NAPHTHA,

Called also volatile oil of petrolium, or "rock oil," is collected among the rocks in Italy and other places. A very strong odour exhales from it, similar to that of turpentine. The Persian naphtha is

greatly celebrated, and much employed in the manufacture of varnish. It is probable that the ancients made their varnish by dissolving resinous substances in naphtha. When distilled, it is perfectly colourless; it may thus be used in the preparation of the varnishes.

Armenini, in chapter ix. of his book, gives receipts for different sorts of varnish, and describes one, composed of naphtha (oglio di sasso) and of turpentine (oglio di abesso), which, he assures us, was used by Parmegiano and Corregio.[1]

Oil of naphtha, as well as those of lavender and rosemary, gives out so strong an odour, that in this respect it makes the use of them rather disagreeable.

In the sixth volume of the Annals of Chemistry, we find a receipt of Monsieur de Saussure's for destroying the odour of naphtha, without altering its powers of solution. The same method is equally applicable to other volatile oils, and when so prepared, there would be nothing to prevent their being employed in the preparation of varnish.[2]

[1] See, at page 33, the note relative to the varnish described by *Armenini*.

[2] This process consists in mixing, by small portions at a time, the sulphuric acid of commerce with oil of naphtha, and then allowing this combination to remain in contact for several days in a flask well closed from the air, taking care to shake the vessel fre-

SECTION II.

TO PREPARE VARNISHES PROPER FOR PAINTING.

ITALIAN VARNISH.

I have already noticed the strong oil prepared in Italy from a very remote period, and which possesses the double advantage of drying well, and preventing the flowing about of the most liquid glazing. It is prepared by incorporating, over a slow fire, two parts of linseed or nut oil, with one part of litharge, ground as fine as possible.[1] The mixture must be frequently stirred with a spatula, to quicken the operation. The combination is completed in a longer or shorter period according to the quantity of the materials employed. This is ascertained by dropping a small quantity of it on a flag, or other cold surface, when, if it fixes in cooling, like tallow, the operation is rightly done; if not,

quently. This operation gives a black sediment, or precipitate, which appears to be a combination of sulphuric acid and the odorous principle of the oil. The clear liquor is then drawn off, and the portion of acid with which it is united is removed from it by saturating the liquid with a solution of caustic potass; or quick lime will do equally well.—*Annales de Chemie et de Physique*, 1817, tome vi. p. 308.

[1] Nut oil gives less colour in this preparation than the oil of linseed.

then it is clear that the process has been stopped too soon: the oil must again be placed on the fire, and about a sixth part of pure white wax added to it. This is useful in all cases, to give a firmer consistence to the preparation. When the wax is entirely incorporated, the mixture is to be thrown on the grinding slab, and it should be ground well with the muller to prevent any separation, and to cause the parts to be perfectly united.

In using this oil, some mastic varnish must be added to it, and well mixed upon the palette. This mixture forms a soft pomatum-like substance, which flows freely in the pencil, and which remains in its place, without flowing about. It is therefore proper for glazing; but the addition of varnish to it is necessary to prevent its frothing under the brush, as it would do like soap, and this accident would prevent the work from being clearly seen. This combination is in fact a soap, which, except that it is not soluble in water, has all the other qualities of the common soap formed by the union of oils and alkalies.

It would, therefore, be better to prepare it in boiling water, as we prepare common soap; for it is not easy so to regulate the temperature of the fire that it shall not exceed the proper degree, and the heat of boiling water is always the same. As the

water evaporates, more water must be added; and when the union of the materials is completed, the water remaining at the bottom of the vessel is found colourless, and has a sweetish taste. To this liquid the name *glycerine* (*the saccharine principle of oils*) has been given.

Also, by a long continued trituration, the same combination could be formed, which would have less colour, especially if we use oil clarified in the sun.

It is of much importance that the litharge be pure; for, should it contain oxide of copper, this substance would be dissolved by the oil, and would give the varnish a greenish tint.

TO MAKE FLANDERS VARNISH.

Dissolve grain mastic in alcohol: this operation is requisite to detach the impurities which are mixed with the resin. The proportion of spirits ought to be sufficient to cover the mastic, and one-fourth part more above its surface.

The solution must be carried on with a very slow heat: when completed, the liquid is muddy, but it clears very well in a short time; as the impurity falls to the bottom, this subsidence may be accelerated by filtering the mixture through cotton.

The preparation being thus freed from all impurities, one-eighth part of fine white wax is to be

added to it, and the mixture is then to be fused in a *balneum mariæ* (water bath); when thoroughly melted, it should be thrown into a bason of cold water, where it is to be worked with two wooden spatulas, care being taken not to let the fingers touch it, for it is so clammy that it would be difficult to remove it from the skin.

During this operation the alcohol separates from the resin and wax, uniting itself with the water, and the substance becomes more firm by degrees, so that at length it may be handled without the danger of its sticking to the fingers, provided that they are kept wet. The composition is then formed into balls, or rolls, which may be preserved to any period by keeping them from dust.

The mastic of commerce is sometimes mixed with sandarach; but it is easy to discover this adulteration at the time of working the mixture in the cold water, for the spirit of wine, though weakened by the water, still holds the sandarach in solution; it carries that resin with it, and this combination, in precipitating, gives the water a milky colour. When this happens, the mixture is to be washed until the water comes away quite clear.

To make use of this prepared substance, a portion of it is to be melted, at a slow heat, in white drying oil, nearly equal parts of each; when united

its fitness is to be tried on the palette with the knife; and if it is found too soft, add the mixture; if too hard, add the oil.

As this compound contains drying oil, a pellicle is soon formed on its surface, for which reason it would be adviseable not to melt a greater quantity of it than could be used in a few days, and to keep it under water.

Or the mastic and oil may also be combined thus:

Take forty grains of mastic varnish, made with equal parts of mastic and oil of turpentine;

Forty grains of nut, or poppy oil, clarified in the sun;

Five grains of acetate of lead in powder: expose them to a light ebullition in a *balneum mariæ*, and then pour the mixture into pure water, and stir it for some time, renewing the water to carry the portion of acetate not combined.

If we could get genuine mastic, free from impurities and adulteration, there would not be any occasion to dissolve it in alcohol; it could be melted and incorporated at once, and then washed and rendered fine in the cold water.

We may also, with equal success, dissolve the mastic in clear drying oil. Allowing it to rest until all the earthy particles have subsided, and then drawing it off carefully, add the wax as before.

ENGLISH VARNISH.

When mastic varnish is mixed with drying oil which holds litharge in solution, the mixture soon assumes the appearance of a firm jelly; which is strong in proportion as a greater quantity of litharge, and a stronger varnish, have been used.

This substance holds its place on the palette like the colours, never moving from its place.

The peculiar nature of this mixture makes it particularly useful in glazing, for it flows under the brush with great facility.

But instead of using brown drying oil, it would be preferable to use that which is prepared without fire. It is also better that the mastic should be of a full body; for if the essential oil is smaller in proportion to the resin, the drying quality will be less active, and the operations can therefore be carried on in painting, much longer, without being interrupted by the vehicle becoming too thick.

OIL COPAL VARNISH.

This varnish has been known a long time, and has, in all probability, been used by many of the Italian painters, as, I believe, it was by Fra Bartolomeo, whose pictures are remarkable for the bril-

liancy of their colours. Its preparation is thus described by Theophilus, in his work already mentioned :—Put some linseed oil into a new earthen vessel; then add a sufficient quantity of resin called *fornis*, ground to an impalpable powder; the resin resembles very much transparent incense, but its fracture is brighter; place the mixture on lighted charcoal, and let it digest until it is reduced to one third part; but great care must be taken that it shall not boil over, or the flame rise high enough to communicate with it, as it would then blaze out instantly, and it would be extremely difficult to extinguish it. Pictures prepared with this varnish are brilliant, and remain without any alteration.[1]

ANOTHER METHOD.

Place around a brazier three or four granite or other stones capable of resisting the action of fire; upon these supports is to be placed a common earthen vessel containing the resin *fornis*, called by the Romans

[1] Pone oleum lini in ollam novam parvulam, et adde gummi quod vocatur *fornis*, minutissimè tritum, quod habet speciem lucidissimi thuris; sed cum frangitur, fulgorem clariorem reddit; quod cum super carbones posueris, coque diligenter sic, ut non bulliat, donec tertia pars consumatur; et cave à flamma, quod periculosum est nimis et difficile extinguitur si accendatur. Hoc glutine omnis pictura super linita lucida fit et decora ac omninò durabilis.

glassa; cover the vessel with a smaller one, pierced with holes in the bottom: lute them together so closely that the vapour may not escape between their joints: the resin is to be stirred with a crooked iron rod, furnished with a handle, and the melting of it carefully ascertained.

Meanwhile, some linseed oil is to be prepared in another place, and poured, by degrees, in a boiling state on the melted resin, at the moment when it is completely fluid. This state of it can be ascertained by drawing out the iron rod, off which it will run in threads. Stir it well, to assist the incorporation, and let it remain some time longer on the fire; try it occasionally, by dropping some of it on a piece of wood or stone, to ascertain whether it has a proper consistency.

The best proportion of the materials to be used is, one part resin, and two linseed oil: when sufficiently boiled, take it off the fire, and set it to cool.[1]

[1] Compone quatuor vel tres lapides qui possent ignem sustinere ità ut resiliant, et super ipsos pone ollam rudem, et in eam mitte suprà dictum gummi fornis quod *Romana glassa* vocatur; et super os hujus ollæ pone ollam minorem quæ habeat in fundo modicum foramen. Et circum lineas ei pastam ita ut nihil spiraminis inter ipsas ollas exeat. Habebis etiam ferrum gracile manubrio impositum, unde commovebis ipsum gummi et cum quo sentire possis ut omnino liquidum fiat. Habebis quoque ollam tertiam super carbones positam, in quâ sit oleum calidum; et cum gummi penitùs liquidum fuerit, ita ut extremo ferro quasi filum trahatur, infunde

We are not aware what kind of resin Theophilus designates as *fornis* and *glassa Romana*. We do not find these terms in our glossaries; but every inquiry proves, that there is not any other resin to which this description would apply. The American copal was not known in the time of Theophilus, but the Italian painters must have been long acquainted with that of India; and it is from that region that the greatest proportion of the copal of commerce is still brought.

The two methods described may be successfully employed. And it is worthy of remark, that the proportion of one part of resin, to two of oil, must produce so strong a varnish that it would not be possible to use it without diluting it with an additional quantity of oil. If the text be correct, we must suppose that only a part of the resin was dissolved: for when the whole is to be united, it will require four or five parts of oil to one part of copal. I am also of opinion, that the intention of Theophilus, in directing that the oil should not be boiled, was,

ei oleum calidum, et ferro commove, et insimul coque ut non bulliat, et interdum extrahe ferrum et lini modice super lignum sive super lapidem ut probes diversitatem ejus; et hoc caveas in pondere ut sint duæ partes olei et tertia gummi. Cumque ad libitum tuum coxeris, diligenter ab igne removens et discoperiens refrigerari sine.

that its ebullition might not become gaseous, and rush out of the vessel.

Gum copal will neither melt, nor combine with oil, until the latter is at the boiling point. This is the moment of which we ought to take advantage, if we desire to have a varnish very slightly coloured. When the operation is carried on in a glass mattrass, all the points connected with it may be observed with exactness, and in this way it is also the most likely to succeed.

For this purpose a glass mattrass, with a short neck,[1] is used; this is to be filled about two-thirds, with a mixture containing five parts of nut oil and one part of copal, finely powdered. To prevent any risk in approaching the fire, and to manage the process carefully, the neck of the mattrass must be carefully fastened by iron wire to the end of a long forked stick. Thus prepared, the operator holds the mattrass over a furnace filled with ignited charcoal, without any flame, and care must be taken not to bring it forward too suddenly. When the oil has acquired a heat superior to boiling water, the copal is seen in agitation, ascending to the surface of the liquid; the tempe-

[1] If the neck of the retort was long, the water which is evolved with the other vapours would condense, and, flowing back again into the vessel, would cause those explosions that are always disagreeable, if not alarming.

rature rises progressively; the resin ascends in a greater volume; and vapour begins to leave the aperture of the vessel: by degrees this becomes abundant, and fills all the vase; the surface of the oil tumifies like milk when about to boil, and it would evaporate in foam if the vessel were not removed a little from the fire. This is the moment at which the copal begins to dissolve: the oil, changing to a state of vapour, has acquired the proper degree of heat to effect that object, and, by giving gently a rotatory motion to the mass, the white vapours and scum soon disappear, and the fire being seen clearly through the liquid, indicates that the operation is complete.[1]

When the copal has not been well ground, some small lumps will appear, which could not be dissolved because of their size: but this may be done by prolonging the ebullition: the varnish would of course become more coloured by remaining longer exposed to the fire. It would, therefore, be better, previous to the operation, to pass the pulverized copal through a silken sieve, or still better to grind it

[1] When the oil has been exposed a sufficient length of time to the rays of the sun, it no longer tumifies, neither does it give out any scum. Should it have become very viscous, six parts of oil must be added, otherwise the varnish will be too thick for use.

well with oil before it is put into the mattrass: this will certainly quicken the operation, and consequently the varnish will be less coloured.

The mattrass might be placed in a sand bath, and allowed to remain there without being stirred until the whitish vapours begin to fill up the cavity, and the oil mounting in foam, it would be in danger of rushing out of the vessel; but in this case the operation would be much slower, and the fire must be much stronger, to bring the sand up to the degree of heat required. I have tried to produce this combination in a silver vessel, but did not succeed; for the external air prevented the resin from heating, and it was merely softened, though coloured strongly.[1]

It is, therefore, better to employ a mattrass in which the heat is strong, and kept nearly equal; but, to give more certainty to the operation, I would advise that no more than one or two ounces of copal should be dissolved at a time; but should it be intended to melt several pounds at one time, recourse must be had to the second process of Theophilus,

[1] I am quite persuaded that we should always succeed in dissolving the copal when reduced to an impalpable powder, if we took the pains to project it in small portions upon the boiling oil, and then waiting patiently until that was dissolved ere we added another part of the powder; but varnish made in this way would no doubt be a good deal coloured.

which, as I have stated, is the same that is followed at the present day in making oil varnish; substituting a mattrass of copper, with a wide opening, instead of the two vases luted together at their edges. This mattrass should be furnished with two handles, for the convenience of removing it, and its edge should be surrounded by a ledge, which will form a channel: this is a most useful appendage; for, without the greatest care in constantly stirring the substance, it foams, rushes forth, and would burst into flame, were it not prevented by this trough.

With this apparatus five or six pounds of copal may be fused at a time. Some very experienced manufacturers have assured me, that this quantity is the most proper; they say that if only one pound is used, the varnish imbibes a strong colour, and that only the same thing will occur if ten pounds are used. But I know not why, with an apparatus properly constructed, we should be unable to dissolve a pound of copal into the best varnish.

As soon as the copal begins to dissolve, whitish vapours arise from the neck of the mattrass, which increase abundantly; it must then be carefully stirred about with a fine iron spatula, to prevent the melting resin from boiling over, and to accele-

rate the fusion by changing the surface. The process is complete when we no longer observe any more pieces of copal floating about, and when, in drawing forth the spatula, the resin runs rapidly in drops, and falls off without forming threads.

Upon this fused matter the boiling linseed oil is to be poured slowly, stirring it well at the same time to insure its union; because the temperature of the boiling oil being inferior to that of the melted resin, the latter would lose its fluidity if the oil was poured upon it at once, and their union would be imperfect.

When this incorporation has taken place, the spatula is drawn out, and some of the liquid is dropped on a piece of glass: should the drops be perfectly transparent, the union is complete; if cloudy, then the mattrass is allowed to remain on the fire until the drops become transparent; this soon takes place, but the varnish is of a higher colour.

When this operation has terminated, there only remains to be added the oil of turpentine, to give the mixture that degree of fluidity which is desirable: for this purpose the mattrass is taken off the fire, having its orifice well covered with a wet cloth, to prevent the oily vapour from expanding, the odour

of which is very disagreeable; the mixture is allowed first to cool a little, merely to prevent the volatile oil from becoming ignited.

The manufacturers of varnish usually dissolve their copal in the open air, to prevent the accidents to which the operation is exposed by catching fire: a single spark from the furnace is sufficient to ignite the vapour, which issues in a large quantity from the mattrass. Whenever this happens, the flame must be stifled by throwing over it a wet cloth, kept ready for that purpose; but a coverlid, furnished with several folds of cloth, would be still better, for, by its handle, it may be applied instantly to the vessel.

But these accidents could not happen if the furnace was constructed so as to prevent all communication between the fire and the vapour, and if they would use a very simple apparatus, which one of the most experienced manufacturers has had constructed, according to an idea which I communicated to him;, the contrivance not only prevents the possibility of the vapour igniting, but the bad smell is also destroyed by it.

This apparatus is composed of a tin or copper tunnel, about two feet in length, which is inserted into the neck of the mattrass, and the upper end is

closed with iron wire; the vapours easily pass through, become inflamed, and burn like gas: the neck of the mattrass, into which this tunnel is fixed, is sloped and resembles the neck of a flask; upon this inclined plane is a tabular opening, stopped with a cork, which can be taken out to allow of the resin being stirred with the spatula.

The same manufacturer using it in the open air, and finding that the wind extinguished the flame, conceived the plan of substituting, for the straight tunnel already mentioned, one of a curved form, which descended near the ground. The fumes condensed in this tunnel; and, cooling readily, he collected, by distillation, volatile oil of copal, which, when rectified, may become very useful.

In this way he obtained the double purpose he had in view,—in preventing accidents from fire, and in destroying the offensive smell. The safety and salubrity of this method, it is hoped, will encourage our varnish-makers to abandon the barbarous method now generally in use, and that they will adopt this apparatus, which may be still further improved.

It is recommended to use a strong heat in melting the copal. This resin being a bad conductor, the caloric penetrates it very slowly; and the part

first dissolved gets browner in proportion to the time it is exposed to the action of the fire. Always near the close of the operation, care must be taken that the fire be not too strong: too great an elevation of the temperature would cause it to explode; and for this reason it would be proper to arrange the furnace in such a way as that it may be moderated at will, or, which is not difficult, to have the power of interrupting its communication with the mattrass. The varnish would be less coloured if the copal could be drawn off as it fuses, and then incorporated with the oil. This object would be obtained by means of an ingenious apparatus which *Tingry* has proposed for a different purpose, and of which the original idea is to be found in a "*Treatise on Varnishes*," by *P. Bonnani*, who states that he had it from a German.[1] This apparatus is composed of a cylindrical furnace, either cast or of earthenware, with holes properly arranged around its diameter, to introduce the air required in the combustion. At the bottom of this furnace is an opening of circular shape, in which

[1] "Trattato sopra vernice detta communemente 'Cinese,' dal Filippo Bonnani, della compagnia di Gesu." This work has been translated into the French language, and the translation has the rare merit of being faithful to the original text.

should be placed a crucible of conical form; this is open at both ends, the upper being intended to receive a lid closely fitted on.

In this crucible a bag of metallic wire is to be placed, similar in form, but smaller, that it may not touch it in any point; it is secured by hooks of wire; this bag is then filled with copal reduced to very small pieces, and directly closed with a lid, which is firmly fixed by means of iron wire, and it is luted by a mixture of argill and sand.

The crucible, being thus prepared, is so placed in the furnace that its aperture will be exactly in the direction of the opening in which it is fixed; the furnace is then placed upon a tripod, and the crucible is surrounded with lighted charcoal. The caloric soon penetrates to the copal, which, as it melts, flows down into a vase containing boiling linseed oil, with which it is incorporated by being stirred up with a spatula of iron.

Whilst the copal is melting, a great quantity of vapour issues from the crucible, and, being drawn towards the air opening in the furnace, would inflame very quickly, if the communication was not cut off.

This may be done by a large plate of iron, with an opening in it of the diameter of the crucible, the

lower end of which is left outside the furnace, and by directing the vapour in a particular channel. This can be done more simply by covering with wire the air-holes of the furnace, as the ignition will only take place on the outside of the wire.

As the copal will not incorporate with the oil, if the latter is not actually boiling, care must be taken to have it quite ready; for the moment that the furnace is lighted the copal begins to melt.

The proportion of oil employed must be determined by the species of varnish intended to be made. Four or five parts of linseed oil to one of resin will give a varnish that mixes easily with the colours, and which renders them more full and brilliant without drying more rapidly. If a more quickly drying varnish is required, only two parts of oil should at first be added; the varnish will then be so thick that it cannot be used; but, before it cools, two other parts of white drying oil may be added, which must previously be heated to the same temperature.

Finally, should a varnish be required for covering pictures when they are completely dry, only one part of oil is required for two of copal: this should be afterwards diluted with oil of turpentine, sufficient to give it the proper degree of fluidity.

Linseed oil, even when very clear, still contains some mucilage, from which it must be purified previous to the operation: this may be done by exposing it for some weeks to the rays of the sun.[1]

Drying oil is employed in the varnish which is afterwards mixed with oil of turpentine; and as that oil must be in a boiling state, some precautions ought to be taken to prevent its becoming too highly coloured. It will, therefore, be best to boil it first over a slow fire, with only a sixth part of litharge finely ground, and then filtered; when it is thus separated from the uncombined litharge, it may be boiled without danger of its growing darker.

PICTURE VARNISH.

The usual method of preparing this varnish is by dissolving mastic in oil of turpentine, adding to it a sufficient quantity of fine turpentine: this preparation has a full body, is viscous, and gives bril-

[1] The blanching of the oil may be much accelerated by exposing it to the action of the sun in shallow saucers of porcelain; five or six days will produce as much effect upon the shallow liquid with extended surface as could be effected in six months upon the quantity contained in a pint bottle.

liancy to the varnish. But I have already stated it is not durable, from its containing an excess of oil: it only dries on the surface, and this causes the picture to crack; it would, therefore, be better to omit the turpentine, and to increase the quantity of mastic. The following proportions may be used:—

100 parts of mastic,
200 of oil of turpentine.

The best mastic should always be chosen for this purpose; but as the impure parts are not soluble in the essential oil, its colour is not injured by them: they naturally separate and descend, leaving the solution transparent; or it may be filtered through a tunnel with a piece of cotton in it.

The solution of the mastic may be accelerated by grinding it; but it dissolves so readily that this may be dispensed with: in fact it melts as soon as the heat reaches the boiling point, and even sooner; and if only the sun's heat is used, you will have a colourless varnish.[1] Should the above preparation produce too strong a varnish, the addition of

[1] If the solution is to be made by the heat of the sun, it will be requisite to reduce the mastic to a very fine powder, and only to add the spirit of turpentine by small portions, at the same time stirring the mixture with a spatula until they are completely incorporated.

oil of turpentine will give it the consistency required.

Copal varnish could be used advantageously for the first couch instead of mastic. Its superior solidity will preserve the work from the effects of frequent washing; and when the picture is perfectly dry, a fine couch of mastic may be laid on it, which at any time may be removed without in the least endangering the glazing. But many artists object to the use of copal varnish, because it has a slight colour, like amber, and cannot be made as colourless as mastic: yet this is not the fact; for I have succeeded in doing so by following Reaumur's method, by dissolving, without heat, the softer copal: it is longer in drying, but is very proper for pictures. The method is to add the dissolvent by degrees, adding, each day, some fresh material, as the former portion becomes absorbed.

Reaumur used oil of spike, which has more affinity for copal than oil of turpentine; but as that oil is more solid, and evaporates more slowly than the latter, I have only used it to soften the copal, and have finished the operation with the essence in the following manner:—

I have reduced to powder the softer kinds of fine copal, and have ground it in a mortar of porce-

lain, with a little of the volatile oil of lavender, the purest I could obtain; the copal is soon softened, and becomes a sort of thick jelly; I then allow it to remain for a day, stirring it occasionally; on the following day I added a few drops of turpentine oil, and triturated them together, continuing this treatment until the union was complete, which occupied three weeks in summer. I have also employed æther to commence the solution, and finished as before.

This operation would be completed in a shorter time by heating it in some degree; but then the dissolvent must be added drop by drop: for when the solution is nearly complete, should too much oil be added, it will not combine, and even a separation takes place between the oil and the resin; when this happens, the oil must be drawn off, and returned in smaller portions. I have used the essential oil of rosemary for that of spike, and it has produced an effect much more rapidly in dissolving the copal, particularly if a little spirit of wine be added. The latter oil is more drying, and would be most useful in the preparation of varnish; but its odour is so strong that few persons like to use it, though, as I have stated before, that pungent smell may be prevented.

CHAPTER III.

ON THE USE OF VARNISH WITH THE COLOURS.

Of the four species of varnish, which I have just described, the process for making the copal varnish appears to me entitled to a decided preference:[1] it gives greater brilliancy and transparency to the colour; and though it dries slowly enough to allow of the most careful execution, yet it dries completely, and becomes very durable. It is not so firm on the palette as the others; but it may be prevented from running down by adding to it a little mastic, wax, or hard sperm. In the following chapter I shall point out the precautions to be attended to when it is used in glazing. The selection of these varnishes chiefly depends upon the use

[1] It has been already remarked that this is the varnish which Prudhon always used during the latter years of his life. His picture of Christ on the cross, in the Louvre, is painted with this varnish; and we can there judge of the effect it is capable of producing.

they may be applied to, and the peculiar habitudes of each artist in working with colours more or less liquid.

When it is intended to paint up at once on a very smooth ground, a very viscous varnish must be rubbed over the surface, or the colours will not adhere to it; this ought to be rubbed on with a very stiff brush; it will give a body to the colour, rendering it fine, and preventing a fresh touch from taking off that on which it is laid.

Should it be required to glaze a great portion of a picture, the varnish must be made liquid enough to flow freely under the pencil, without spreading beyond the place to which it is applied. In such cases a little practice will soon teach us to choose the best for our purpose, observing that it can be rendered more solid by the addition of the copal.

It often happens that very skilful painters have not any great facility of hand; some are obliged, as were Leonardo da Vinci, Dominichino, and Rembrandt, to return several times to their work. Those, therefore, who have a similar slowness of execution, should be careful in their commencement to use colours of a very drying nature; for colours that are slow in drying are more liable to be disturbed and altered.

When the work is not intended to be painted

up at once, and when it is necessary to return several times to the principal parts, there must not be any varnish used in the first painting, and but a small quantity in the next operations. It is in the finishing that all the transparency and brilliancy of the colour is to be brought forward: and, more especially to prevent absorption, to secure the complete drying of the colours in the lower as well as the upper couches, it will be found useful to use distemper grounds.[1]

SECTION I.

ON GLAZING.

The effect produced by the colours used in glazing is such, that it is impossible to produce any thing like it with solid colour; it forms a distinct series of tints, without which it is impossible to represent transparent objects; it is to this power that oil painting owes its supremacy over distemper painting; but as it is of great consequence to imitate the transparency of nature, so we should be careful so to use our means as not to overlook the advantages derivable from the contrast of unglazed colours. It is a fault of the Flemish school that their glazing is

[1] See Chapter V. On the preparation of panels and primed cloths.

sometimes applied in wrong situations, and where, had the colours remained opaque, a better effect would have been produced. Suppose, for instance, a clear water near a rock, or fine bank, it is evident that the opaque bodies should be painted with mat or dull colours, and then the glazing employed in giving transparency to the water would produce a more natural effect.

Glazing is never rightly performed except when it gives to the picture the effect of coloured varnish.

To obtain this essential object, the varnish should be well prepared, it should flow freely in the pencil, and not spread beyond its place; and the colours should be prepared and ground as finely as possible.[1] By attending carefully to these conditions, such opaque colours as vermillion, the oxides of iron, and even Naples yellow, may be used in glazing, and produce tints that cannot be obtained by any other means. It is always best to glaze as soon as the picture is dry enough to prevent the glazing being absorbed; it then forms a union with the colours beneath it, and is less liable to be scoured off in the cleaning. This, however, is not always

[1] The perfect trituration of the colours increases their brightness and transparency.

possible with some glazings which affect the general tone of the picture, and which cannot be used until it is nearly completed.

With respect to the glazing on solid colour, which we see so frequently practised in the works of Rubens, and which are the most lasting, they must have been touched on when the colours on which they are laid had become firm enough not to be disturbed by the pencil.

It sometimes happens that the parts to be glazed become too dry, and then the glazing runs off them like water from an oiled surface: when copal varnish has been used, the work is particularly liable to this accident. In such a case it is best to wash the part with alcohol and warm water, mixing afterwards some drops of alcohol in the glazing, or moistening the brush in that liquid: this will make the glazing lie on quite smoothly. It would answer equally well to apply at first a very light couch of the drying oil and mastic varnish described at page 81.

The intention in glazing pictures is to give a natural and agreeable mellowness to the execution of the work. For this reason it is, that those parts of the picture intended to be glazed should be painted with firmness in solid colour. It should be borne in mind, however, that softness is not necessarily

the result of glazing; and the pictures of the great masters of the Venetian and Flemish schools give abundant evidence of that fact. In glazing, it is of great importance that we should take into account the change that time occasions in the colours of oil and varnishes. It is, as we shall prove in the next paragraph, quite inevitable that they should take a yellowish tone, of a lighter or deeper shade according to the time they may have been painted; therefore, such precautions must be taken as will prevent, as far as possible, so great a disadvantage.[1] For this purpose, when bright parts are glazed, to which even a slight tinge of yellow would be a disadvantage, there should be only the smallest portion of oil used. Besides, the glazing ought to allow for the alteration which this yellow tone will produce in the original colour. For instance, if we wish to glaze a grey shadow upon white, it is better that the violet should predominate than the

[1] Several of Titian's pictures are covered with a bistry tint, produced by the varnish used in their glazings having turned yellow. Such changes are not observable in the pictures of Fra Bartolomeo; a fact which proves that the latter employed a better varnish. Neither is the above defect to be seen in the genuine works of Rubens: possibly he may have composed his shadow tints with a mixture of ultramarine lake and Dutch pink: the fading of the latter would balance against the yellow tendency of the oil.

red, for the mixture of yellow and violet produces the true tint required.

SECTION II.

ON THE EFFECTS WHICH LIGHT AND AIR PRODUCE UPON OILS AND RESINOUS SUBSTANCES.

In describing the natural properties of oils, I have stated that the various shades of yellow colour arise from a colouring substance, which produces the same effect on wax, and is destroyed by exposure to a strong light; but wax, after being bleached, resumes its original colour if left in a dark place which is badly ventilated. Oils are liable to a similar alteration: after being bleached they become rancid; that is, more or less coloured according to the situation of the places where they have been kept. The whole class of oily substances is liable to this change. Even the resinous bodies which are most free from colour, such as mastic, sandrach, and copal, (which last is the firmest of all,) are found coloured on the surface with a yellowish tinge, which penetrates to a greater or less depth according to the nature of the substance, and the length of time they may have been

deprived of the light in a bad atmosphere. Even amber, in time, will take a brownish tone.[1]

This alteration in the colour of those substances ought to be well attended to, and no time should be lost in carefully watching every circumstance connected with this tendency to take a yellowish tone, so inherent in all the oils and varnishes. The experiments which have been made for this purpose show us, that if we put a couch of oil or mastic on a surface of fine white lead, or glass, or white pottery, and then place them apart in a dark situation, where the circulation of the air is confined, and place another portion in a light and airy situation; in a few years we shall be satisfied that the combined influence of the air and light retards very much the yellowish tendency of the oils and varnishes, and that copal varnish, which is much harder than mastic, preserves its original brightness much longer than the others. It would appear evident from these facts, that the best way of preserving pictures would be to varnish them lightly with copal at first, and when this layer is

[1] There is a very striking example of the alteration which oily substances produce upon the transparent, varnished, or oiled paper, used in tracing. In the course of a few years this paper acquires a very dark brownish yellow colour. In such a case it would be well to examine whether some combustion of the paper has not taken place from the action upon it of the oily substance.

perfectly dry, to lay over them a couch of mastic. In a few years this will become yellow or chilled, and then it may be removed. The copal varnish, being extremely hard, will not suffer by the removal of this covering, but will preserve the picture so well, that even the glazing cannot be endangered in the cleaning.

SECTION III.

OF CRACKS IN THE SURFACE OF PICTURES, AND MEANS OF AVOIDING THEM.

I have elsewhere observed, that those cracks we so often see in pictures are not always the consequences of using varnish, but that they will constantly appear when the lower couches of paint remain soft, at the same time that those on the surface are dry.

When a couch of thick drying oil is applied to the surface of a primed cloth, the surface of the latter soon becomes dry: when this is painted upon afterwards with flake white, the colour is absorbed immediately, and it will dry so much more quickly because a portion of the oil it contains will leave it to unite with that of the under couch. In such a case, should the atmosphere be warm enough to allow the colour to dilate, the couch of white will

be rended.[1] To prevent this state of things, care must be taken to commence the work with colours that dry readily, and not to use bituminous earths, but, instead of these, to employ charcoal black, raw umber, and oxide of iron: if the lakes are used, they should be ground with drying oil, and mixed with the red oxide of iron, massicot, or other colour of a drying nature.

Many artists make their first painting in transparent colour, like a wash. It cannot be denied that this method is favourable to colouring: it was the practice of Rubens and the Flemish school; yet Titian, Corregio, P. Veronese, and Rembrandt, have commenced their first lays with solid colour, and, with the aid of glazing, have obtained as much transparency as we find in the works of F. Bartolomeo and Rubens, who commenced with washes. Besides, it must be observed, that the earlier painters who in their first painting pursued an extreme degree of transparency, always worked on panels primed with plaster of paris; but if, like P. Veronese, they painted upon distemper grounds, they need not be afraid of cracks, for the excess of oil would be carried of by the priming of the canvass.[2]

[1] See in Chapter VI. "*On the Restoration of Pictures*," the remedy for these cracks, when they are not of too long a standing.

[2] See, in Chapter V., the article on the method of laying the first painting, or dead colouring, expeditiously upon distemper grounds.

CHAPTER IV.

ON THE PREPARATION OF COLOURS.

YELLOWS.

CHROMATE OF LEAD.

This colour is found quite perfect in its natural state: that of commerce is an artificial production. In its natural state it has long been known as "Siberian red lead." In 1797 *M. Vauquelin* analysed it, and found it to be a combination of oxide of lead and an acidifiable metal, to which he gave the appellation of "chrome," because of the various colours which the different preparations assumed. In fact, the chromate of lead is yellow; that of mercury, red; of silver, purple; and the oxide of chrome is green, and very valuable for porcelain and enamel, because it will resist a very high temperature almost without changing.

Red lead, which was the object of M. Vauquelin's enquiries, has hitherto been found only in Siberia, and even there it is not common; so that the laborious research of this learned chemist would not have been of much advantage to painters, if it had not been for the discovery, in France, of a mineral containing a considerable portion of oxide of chrome, mixed with oxide of iron. It has also been found in the United States of America, chiefly in Maryland; and it is from Baltimore that the greater portion of this substance is exported. The chromate of lead is prepared with this mineral by the union of the acid with oxide of chrome, and at the same time combining potass with the acid; then decomposing the chromate of potass with soluble salt of lead.

For this purpose, one half part of the nitrate of potass is to be mixed with one entire part of the earth containing oxide of chrome. This mixture is then to be calcined in a close crucible, and the substance is afterwards to be washed in warm water, filtered, and thrown into a solution of acetate, or nitrate of lead; and nothing more is required to complete the operation than to wash the precipitate[1]. In proportion as the chromate of potass is in the neutral state, or that of subchromate

[1] The nitrate of lead produces the finest yellows.

and according as the precipitation is made in cold or warm water, the tint will vary, from a delicate clear yellow to that of orange colour.

It is not, however, a permanent colour, and is less so in proportion to the oxide of lead it contains. In a few years its brightness goes off, and it becomes like yellow ochre; but when combined with alumine, it continues brilliant for a much longer period. I believe that a mixture of alumine, silex, and chromate of lead, will sustain a considerable degree of heat, and that the colour, half vitrified, will be unchangeable.

MINERAL YELLOW (CHLORIDE OF LEAD).

This is a combination of lead and chlorine. It is prepared in various ways: the following method by M. Chaptal is one of the oldest on record:—

Four parts of litharge, reduced to an impalpable powder, are moistened with one part of marine salt, dissolved in four of water.

It is then formed into a thin paste, and to remain undisturbed until it begins to whiten; it must then be stirred well with the spatula, to prevent its growing too hard.

In proportion as the consistency increases, salt is added; and if it appears that there is not suffi-

cient of this ingredient, water must be added to retain the paste in a proper condition. In about twenty-four hours this compound should have become well bleached, very compact, and quite free from lumps: but it must still be stirred occasionally, to complete the decomposition: it is then to be carefully washed, to deprive it of the soda, which will be found separated from the marine salt, and the white paste must then be placed to drain on a filter.

When dry, it is reduced to powder, and exposed in the receiver of a reverberatory furnace, until it assumes the yellow colour required; this powder is then to be thrown into a crucible which has been brought up to a red heat, and is then returned into the furnace, where it is only allowed to remain until the composition has melted; thus fused, it is thrown on a plate of iron; and when cool, it forms a crystalline mass striated transversely.

I have witnessed in England the following method of producing this pigment:—

Acetate of lead was first decomposed by marine salt: the chlorine, as in the former instance, was separated from the soda, and formed a new combination with the lead; this chloride of lead was then

carefully washed, and when dry was mixed with a certain quantity of pulverized litharge; it was then melted quickly in a crucible, and thrown upon a plate of iron; but according as the mixture is exposed for a longer or shorter time to the action of fire, the shade of colour will be lighter or darker; the heat is therefore to be kept equal; the crucibles are heated to red at first, and withdrawn at the same time.

In the following process bismuth and antimony are used, and should have the effect of rendering the colour more permanent. They are ground apart, that the proportions may be exactly ascertained, which are as follow:—

Bismuth, ...	3 parts
Sulphuret of antimony, .	24
Nitrate of potass, . . .	64

This mixture is to be dropped by degrees into a heated crucible; when dissolved, it must be thrown into a vessel of water, where it is to remain, and must be well stirred for the requisite time.

It must then be repeatedly decanted until the water has lost all its smell; it is then to be filtered, and the oxide thus obtained is a fine powder, of an impure yellow tint.

An eighth part of this oxide perfectly dry, is then

mixed with one part of muriate of ammonia, and sixteen parts of very pure litharge.

The fusion is then to be carried on as in the English process: great care must be taken, however, that the degree of heat, and the duration of the process, shall be exactly the same. It is as well to be aware, that the best crucibles will not be able to sustain more than three or four operations; and also, that they do not stand the heat, if kept exposed to the fire during a longer time than is required to fuse the mixture. Fifty years ago the mineral yellow was not known: it is not so permanent as Naples yellow, and grows paler in time; it may be used with the latter colour and with the ochres.

NAPLES YELLOW.

The discovery of this colour belongs to high antiquity, even so far back as the earlier working of enamel. The Italians give it the name of Giallolino; *Cennino Cennini* writes it so: Paul Lomazzo styles it *Giallolino di Furnace di Fiandra e di Allamagna;* but it is probable that when the French artists began to use this colour, they obtained it direct from Naples, where perhaps it was made of a better quality than elsewhere.

There is in the Memoirs of the Academy of Sciences, A. D. 1772, an account of a process communicated by M. Fougeroux de Bondaroy: it is as follows:—

Proportions to be used.

Ceruse	12 *oz.*
Sulphuret of antimony	2
Calcined alum	0 ½
Sal ammoniac	1

"These materials must all be reduced to powder, then mixed in exact proportions, and placed in an earthen pan covered with a lid of the same material: this pan is then to be placed in a potter's furnace, where it is to be calcined, first at a low heat, increasing it by degrees, until the vessel has assumed a moderately red appearance; it will require three hours of this calcination before this mixture is properly prepared.

"The product of this operation will be a fritty substance, of a golden yellow hue; this frit is then thrown into water, to separate it from whatever salts it may contain; it is then ground, and its tint becomes much paler." This process has been repeated exactly as directed, but without success.

M. Fougeroux has translated into the word *alum*, the Italian expression, which in the receipt

given to him, was doubtless *allume di fecia*, that is, "salt of tartar;" he is also mistaken in naming "*sulphuret* of antimony" amongst the ingredients, it is the "*oxide* of antimony" that should be used.

In a collection of receipts relative to various processes of the arts, printed at Venice, in 1758, is a memoir by Passari on the manufacture of *faience*; mention is also made in it of the materials for compounding Naples yellow. According to that author, it is thus prepared:—

Antimony	1 *lb.*
Lead	1½
Common salt	1 *oz.*
Tartrate of potass . .	1 *

Passeri observes, that by changing the proportions, the yellow obtained will be of a more or less golden hue. In four out of the six receipts which he gives, there is no mention whatever of marine salt; the effect of this salt would be to render the colour more clear, but less rich, because it produces a portion of chloride of lead (mineral yellow), which takes away the golden tint that originally characterises the combination of the oxides of lead and antimony.

* Allume di fecia.

In the manufacturing of Naples yellow, it is of great consequence that the lead and antimony should be in the complete state of oxides; they must be intimately blended together in the grinding, and afterwards passed through a silken sieve; the mixture is then to be laid in a vessel of unglazed earthenware covered up, and placed in a potter's oven, in the least heated part of it, to prevent the danger of the fusion and de-oxidation of the lead.

The yellow used in enamel painting, is very similar to Naples yellow; it is composed of the oxides of antimony and lead; by varying the proportions, and also the duration of its exposure to the fire, different shades are produced.

M. Guimet, to whom the arts are very much indebted for his invention of artificial ultramarine, has sent me a specimen of the yellow of antimony bearing a fine golden tint, more intense than that of Naples yellow, and he is quite satisfied as to its durability.

It is prepared as follows:—

Antimoniate of potass, or diaphoretic antimony, (carefully washed,)	1 part.
Pure minium, ...	2 parts.

These ingredients must be mixed carefully together, and ground, upon a marble flag, to the con-

sistence of a paste; this paste is then to be dried, reduced to a powder, and exposed to a moderate red heat during four or five hours, taking care to regulate the fire in such a manner as to prevent sit rising to a temperature sufficient to carry off the oxygen of the lead and antimony.

M. Guimet thinks, that the deutoxide of antimony and the oxide of lead are alone sufficient to produce as strong a yellow; it appearing to him, that the potass has no other action in this case than that of completely oxidising the antimony, which process is indispensable to the success of the operation.

IODIDE OF LEAD.

This colour, which is not yet much known in commerce, is as bright as orpiment or chromate of lead. It is thought to be more permanent; but time only can prove its pretension to so essential a quality. It is prepared by precipitating a solution of acetate or nitrate of lead, with hydrochlorate of potass: the nitrate produces a more brilliant yellow colour.

THE OCHRES.

These substances are "hydrates of iron," which

signifies, that they are composed of water and oxide of iron, mixed in various proportions, and sometimes closely combined with various sorts of earth.

The greater the proportion of clay, the brighter will be the colour: when there is a portion of argil, the substance feels greasy to the touch, and has more body than those have which are mixed with chalk and silex.

The yellow ochres become red by calcination: the brown ochres, when pure, produce the finest red.

The "ochre of ru," which is incorrectly spelled and pronounced "rue," takes its etymology from the old word *ru* (ruisseau), a rivulet or brook, probably because that this ochre was found deposited in places formed in brooks of ferruginous waters.

Exposed to the fire, this substance takes a reddish brown colour, not so brilliant as that of the oxide of iron. This fact proves that it contains some remains of vegetable substances, or bituminous matter.

Terra di Sienna is a brown ochre, which, by calcination, produces only a moderately strong red. This proves that it must contain substances which prevent the development of the violet colour, which belongs to the oxide of iron in its pure state.

Ochres may be prepared artificially, by moistening the rust of iron, and precipitating by the alkalis, solutions of this metal. For instance, in precipitating it by the sub-carbonate of soda, or of muriate of potass, of nitrate, of acetate of iron, or persulfate of iron, the most brilliant brown ochres are obtained. If the sulphate of iron is of a low oxidation, the precipitate is olive-coloured, but it soon becomes yellow at the surface by absorbing a greater quantity of oxygen. To extend this operation to all the precipitates, it only requires exposure to the air, by stirring it up for a sufficient time. The same thing may be obtained in winter quite easily, by exposing it to the action of frost in wide shallow pans: the water passing into the state of ice, leaves a small quantity of air disengaged, which unites with the precipitate, and is sufficient to give it an even yellow tone.

When bright ochres are required, it will be necessary to mix alum, in certain proportion, with sulphate of iron; the solution is then to be precipitated by lime water.[1] There exist in the natural state ochres of so very fine a quality, that they require no other preparation than that of being washed; therefore

[1] But this will require a very large quantity of lime, for water only dissolves one five-hundredth part of it.

it is scarcely worth while to manufacture them artificially.[1]

The permanency of these colours is proved by the state of the old pictures. In a box of colours found at Pompeii, and analysed by M. Count Chaptal, he discovered yellow ochre purified by washing, which had preserved its original brightness.

ORPIMENT.

This colour was known in ancient times; the Latins called it auripigmentum (gold colour), whence, by corruption, its present name is derived. It is a sulphuret of arsenic, found perfectly formed in a natural state: it is also prepared by artificial means.

There are two kinds of sulphuret of arsenic, the results of different proportions of these substances in combination. If the sulphur should predominate,

[1] I do not believe that any artificial ochre, composed merely of the oxide of iron, carbonic acid, and water, can have the same permanency as a natural ochre, which contains, in addition to those enumerated, lime, silex, and alumine, in combination. I have founded my opinion upon what we commonly observe of the action of water and air upon iron; for we see, on a dry morning, after a rainy day, that the iron tires of carriage-wheels are covered with rust of a clear and bright yellow colour; in a few days this rust becomes a yellowish brown, and, after some time, it changes to a strong red colour.

the product will be a clear and very brilliant yellow; but should the arsenic predominate, the colour will be orange; and it is then called "red orpiment," or "realgar."

Both these species have been in use from the earliest times of painting; and it is easy to perceive that this colour must not be mixed with white lead, nor with any of those colours into which lead enters, such as massicot, minium, muriate and chromate of lead, and Naples yellow.

The sulphur in combination with the arsenic, having less affinity with this metal than for lead, lets it go, and forms a sulphuret of lead of a dark greyish colour.[1] But orpiment may be employed alone, or with ochres, and other colours that do not act upon them, as terre verte and ultramarine. I have no doubt but that the brilliant yellows, which we see in some ancient pictures, are preparations of orpiment.

Red orpiment, as we shall show in its place, is not so permanent as the yellow sort.

SULPHURET OF CADMIUM.

Chemists who have prepared this colour say that it does not change. I am not, however, aware

[1] It is probable, that after some time the orpiment takes up the oxygen from the lead. This would be an additional cause for the darkening of the tint composed of the two colours.

whether it has been used in combination with white lead. I fear that in such a case the sulphur would quit the cadmium, to unite with the lead. If that should not happen, this would be a most useful discovery. It is to be regretted that at present cadmium is scarce in France; but it is to be hoped, that as chromate of iron has been discovered there, we shall be equally fortunate with respect to this article.

We are assured that the sulphuret of cadmium is used in Germany; and it is to be had here (in Paris) amongst the principal manufacturing chemists.

VEGETABLE YELLOWS.

DROP GUM, OR GAMBOGE.

This is a resinous gum, which distils from a tree called cambogium or caracapulli, which is a native of India, found principally beyond the Ganges. This gum dissolves readily in water, and makes a most brilliant yellow wash. This colour would be useful in oil painting,—as it resists for a long time the action of strong light,—provided the resinous part could be separated from the other parts. Alcohol will dissolve the resin, but will attack the colour also; yet, probably, if the gamboge was powdered, and the alcohol allowed to remain on it

for some time, the greater part of the colouring matter would be deposited, and the resin would remain united to the alcohol.

INDIAN YELLOW.

For many years past the English traders have furnished us (in France) with a brilliant yellow lake, which is more lasting than the greater number of this class. I have been informed by a learned naturalist, who travelled in that country (Bengal), that this colour is manufactured in Calcutta by an Englishman, who keeps the process quite a secret; but the traveller has found out that the colouring matter is extracted from a tree, or large shrub, called *memecylon tinctorium*, the leaves of which are employed by the natives in their yellow dyes. From a smell like cows' urine, which exhales from this colour, it is probable that this material is employed in extracting the tint of the memecylon.

THE YELLOW LAKES.

These are tinctures extracted from various vegetable substances, and joined to a basis, which acts as a mordent, such as alumine, or chalk and alumine. Drop lake is the most permanent of this class: its colour inclines slightly towards the green shade, and is therefore very useful for the brilliant green tints.

In cases where this object would be particularly desired, the colouring matter must be precipitated with acetate of copper; or this acetate, when precipitated, should be tinged with a decoction of wood. It is remarkable that the chrystals of copper are the best for this purpose that have yet been found.

ORANGE CHROMATE OF LEAD, OR SUB-CHROMATE OF LEAD.

This colour is not so bright as the minium and realgar; but it is more lasting than yellow chrome. The action of the oils is always too great upon the oxides of lead to allow of this colour being quite permanent; it should therefore be used with caution in those draperies where its changing would not be of much importance.

MASSICOT (PROTOXIDE OF LEAD).

The substances which are sold in the shops, under the name of massicot, are only ceruse more or less calcined, and are named light, yellow, or gold coloured. Genuine massicot is the strongest oxide of lead (protoxide); its colour is a dull orange yellow.

In the preparation of minium the lead is calcined in a reverberatory furnace; this process gives a

mixture of massicot and lead; these are separated by washing and trituration; the massicot being much lighter remains suspended in the water; it is drawn off, and left to settle; the *depositum* which it then forms is collected and dried, and this is the true massicot. But it is not to be had in our colour-shops; it can only be procured from the red-lead manufacturers. It may be employed with advantage in preparing the drying oils; it produces the same effect as litharge when very finely ground.

It may also be employed as a colour: its tint is not brilliant; but as it is a better drier than white lead, it may be substituted for it in mixing with colours which dry with difficulty, as the lakes and the bituminous earths.

MINIUM.

A higher degree of oxidation transforms the massicot into minium. On a large scale minium is prepared by calcining massicot in reverberatory furnaces; it becomes first of a dark orange colour, then purple, but this last tint disappears on its cooling; when at this point, the doors of the furnaces are closed, but not hermetically, so as to allow of a little air entering. The massicot cools very slowly; and, as it absorbs the oxygen of the

air, it becomes of a strong orange colour, and grows finer in proportion to the slowness of its cooling.

If, instead of massicot, we calcine ceruse, a peculiar red, called "mineral orange," is obtained, it is a minium, but of a tint more pure and brilliant than any of its class.[1]

RED ORPIMENT (REALGAR).

We have seen, under the head "Orpiment," that when the metal predominates, the sulphur is of an orange colour, and it is less permanent than orpiment: for in pictures of flowers, where it has been used, it seems to have absorbed the colours of the ground. Perhaps this would not have happened had the ground been of a colour which did not contain any lead; such as yellow ochre, for instance.

THE REDS—CARMINE.

This rich crimson is a combination of the most

[1] Minium was known to the ancients under the appellation of cerusa usta. It was amongst the pigments employed in the early times of oil painting; but they soon found that the colour faded. It has come under my observation to mark the action of the light directly upon this colour. At one of the exhibitions I noticed a picture, some drapery in which was painted in minium, and in a few days the tone was much injured by the sun's rays.

brilliant portion of the colouring matter of cochineal united to some animal matter fixed upon an acid basis.[1]

There are various ways of preparing this colour, and many receipts have been published; but all these are resolved into the three following methods: *First process.* A pound of cochineal, in powder, is boiled in river or rain water, and to dissolve the colouring matter four or five drachms of subcarbonate of soda and potass are added; this liquor having boiled for a quarter of an hour, eight or ten drachms of alum in powder are thrown into it, and it is stirred well with a spatula or large brush; the vessel is then to be taken from the fire, and allowed to remain quiet for half an hour; the liquid is then drawn off clear into very clean saucers, and well covered up, to prevent dust getting in; at the end of seven or eight days, the water being drawn off, the carmine is found deposited at the bottom of each saucer, and when dry is fit for use.

The second method.—I have seen carmine pre-

[1] MM. Pelletier and Caventou have made a course of experiments upon cochineal, by which they have been enabled to separate the colouring matter in a pure state from the grosser parts. To this they have given the name of carmine.—*Annals de Chimie et de Physic*, tom. viii. p. 250.

pared very quickly as follows. Though the operator thought he had the power of keeping the secret, by disguising some of the materials employed, but in describing that which passed before my eyes, it will not be difficult to supply those details which it was intended to hide from me.

A pound of ground cochineal was put into a copper vessel well tinned; after boiling for a quarter of an hour, two drachms of a substance resembling cream of tartar were added to it, which caused a strong effervescence;[1] the vessel was then taken off the fire, and the mixture immediately filtered through a silken sieve; after this liquid was drawn off clear, another liquid was thrown into it, in which a little carmine had been infused (no doubt to disguise its true colour); this addition immediately changed the colour of the decoction from a dull crimson to a bright blood colour; the mixture was then twigged for some minutes with a little broom of fine osier twigs, and passed through a filter of close linen; the carmine remained on the filter; and I took some for trial, which I found very good.

It appeared to me that the liquor which was thrown on the decoction of cochineal contained

[1] This might have been the acidulated oxalate of potass; that is, salt of sorrel.

nitro-muriate of tin, which instantly changed the crimson of the cochineal to scarlet. I think it also contained alum; and as the union of these two salts produced a whitish tint, which would have discovered the solution of tin, a little carmine was added to the mixture, to disguise it.

Third method.—A pound of ground cochineal is put into a vessel containing four or five quarts of river water; to this is added three drachms of subcarbonate of potass; effervescence accompanies the boiling, which is reduced by the addition of a little fresh water, and stirring it well with a brush; after an ebullition of some minutes the vessel is to be taken off the fire, and placed upon a table in a slanting position, to allow the wash or liquid to be readily drawn into another vessel; six or seven grains of alum in powder are then thrown into this decoction, and it is stirred up with the brush to accelerate the dissolution; the colour soon changes and becomes of a deep red,—this is what manufacturers term the return of the carmine; in about a quarter of an hour the carmine is completely deposited at the bottom of the vessel, and the wash is as clear as if filtered; it holds in solution the colouring matter and a little alum; it is then decanted into a vessel of equal size, which is set on the fire,

adding to the mixture three and a half grains of isinglass dissolved in water and passed through a sieve; the whole must be well stirred with a brush, and then allowed to remain perfectly still until the first appearance of ebullition; at this moment the carmine is seen mounting to the surface of the liquid, and a coagulum is formed, as in clarifying with white of egg; the vessel is then removed from the fire, and the mixture is stirred for some short time with a brush; and in twenty minutes, or at the farthest half an hour, the carmine is found deposited at the bottom of the vessel; it is then decanted, and the *depositum* is thrown upon a filter of fine linen: the isinglass should be cut small, and steeped in water for a night; it swells, and is easily reduced to a jelly by trituration in a porcelain or glass mortar; some boiling water is then thrown upon it, and it melts instantly.

The above receipt, which is the best I am acquainted with, is to be found in several places; but, instead of isinglass, white of egg diluted with water is prescribed; and some advise that the yolk also should be beaten up with it.

Carmine is seldom used in oil painting, except by those who paint flowers. It is a brilliant colour, but it does not long resist the action of a

strong light; it is principally used in water colour drawing, and to colour artificial flowers; it is adulterated sometimes by vermillion, but this fraud is easily detected by dissolving it in a solution of ammonia, which only acts upon the carmine; this produces a very bright red ink, which is fit for use when the smell has gone off. The remains of the cochineal left after the operation are used in making lake.

CINNABAR.

This is also called vermillion, from the Italian word *vermiglio* (little worm), given to the kermes (*coccus ilicis*), which was used as the scarlet dye before the discovery of America introduced the cochineal.

Cinnabar is composed of mercury and sulphur (sulphuret of mercury) very intimately combined. It is found naturally formed in the quicksilver mines; but that which is used in painting is an artificial production. In Germany and Holland cinnabar is prepared by dissolving one part of sulphur, and adding to it gradually five or six parts of mercury; the mixture becomes black, takes the name of ethiops, or black sulphuret of mercury; this substance is then reduced to powder, and sublimed in

appropriate vessels, when a crystallized mass is thus obtained, composed of bright filaments of a violet tint; by trituration it becomes of a scarlet colour.

But the mere grinding will not be sufficient to give a bright tone to the cinnabar; various methods are employed for that purpose, which are not generally known. Some manufacturers grind these ingredients up with plain water or with urine, and afterwards boil it for some time; others treat it with nitric acid; but it does not happen that any of the methods hitherto employed for heightening the colour of cinnabar, obtained by sublimation, give the same brightness as the Chinese vermillion, which appears to be prepared in the moist manner.

Bucholz has obtained some cinnabar of a very fine description by digesting the following mixture in a sand bath,—one part of flour of sulphur, four parts of mercury, and three of potass, dissolved in six pints of water; this compound first forms black sulphur, and, when the digestion is prolonged, the red colour developes itself. The operation could be much shortened by only adding the solution of potass in small portions, to give to the mixture the consistency of thin paste, and supplied as may be required by evaporation, and this, as well as the combination, are facilitated by being stirred constantly by a glass tube.

It is not required to have a precise quantity of potass; a greater portion than may be required of this liquid is placed near the vessel, and used with a spoon as occasion may require. By this process several pounds of mercury may be converted into vermillion. The longer the heat of the fire is kept up, the more strongly the colour will take the carmine tint. If it be requisite to have it of a clear shade, the fire must be moderated immediately as the colour begins to develope itself.

It is very injurious for those employed, to inhale mercurial vapours; for which reason this operation should be performed only in a place where the chimney has a good current of air;[1] there also should be fixed to the tube of glass with which the mixture is stirred a staff sufficiently long to hold at good distance from the vessel; in the same way the spoon should be lengthened with which the potass is added.

When the colour has attained the shade required, the vermillion is thrown into a small vat or tube full of water, and it is washed until all the

[1] For this purpose the apparatus contrived by M. d'Arcet ought to be employed. It was at first used in the workshops of the metal gilders, to secure the workmen from the dangerous action of the mercurial vapour.

sulphuret of potass is carried off. The advantages derived from this proceeding are, that it produces in a short time vermillion finely prepared, and of the particular shade required.

From the striking resemblance which the colours thus prepared bear to the vermillion of China, both in tint and fineness of grain, I am of opinion that the method used by the Chinese in the preparation of cinnabar is not very different from that which I have described.

PERIODIDE OF MERCURY.

Iodine, which is one of the elements of this colour, is a simple substance as combustible as oxygen; it was discovered about eighteen years since (from 1830), in treating with sulphuric acid the sea-water of the soda of Varec. The name iodine is derived from the beautiful violet colour which this substance takes when it is in the state of gas.

At the common temperature it is solid, and has a metallic lustre resembling black lead; it volatilizes at the temperature of boiling water. Combined with the deutoxide of mercury it takes a scarlet colour brighter than vermillion. I made several trials of its solidity some years ago, and found that in a few months it became yellow; but I

have been assured that other essays made since have proved more satisfactory: perhaps the colour which had been sent to me had not been carefully prepared. I have subsequently made a trial, which remained for eighteen months with only a trifling alteration; but so short a time is insufficient to prove its lasting qualities. In England this pigment is sold under the name of scarlet lake, and is used chiefly in water-colour painting. The following process is the best known to me for preparing this colour:—Iodine and zinc (forming iodide of zinc) are first to be combined; for this purpose the zinc must be finely powdered, either by throwing it into water when it is melted, or by levigating it in a mortar until it loses its cohesion and can be easily divided.

The powdered zinc must then be put into a mattrass with the iodine and distilled water, and, by help of a moderate heat, the iodine will combine readily with the zinc, and forms with that metal an iodide, which is then filtered.

Perchloride of mercury (corrosive sublimate) is then dissolved in distilled water; the two liquids are then mixed, and immediately a large quantity of precipitate is formed; this deposit is washed first with distilled water, and afterwards with filtered

river water. The working of this colour is of the greatest consequence, and must be done with peculiar care. It is probable that the portion of this colour with which I made the first essay, and which lost its colour so soon, may not have been sufficiently or skilfully worked.

THE LAKES.

This name was originally given to designate merely the purplish colour called crimson, and when employed alone it always bears that appellation; but in its more extended sense it is applied to all colours prepared by combining a colouring matter or tincture with a basis which is commonly alumine: hence we have yellow, green, or violet lake.

The term itself appears to be of Indian origin. It is probable that the first lakes used in Europe came from India, and were made from the resinous lac so abundant in that country, which yields a purple colouring matter at present very essential in painting, because in many respects it takes precedence of cochineal.

It was first imported into England, where it is called, in commerce, *lac*, or *lac dye*.[1] The people

[1] See page 51,—the article on gum lac.

of India collect this resin, bruise it, and then boil it in water slightly alkaline, which separates the colouring matter; the solution is then precipitated with alum, and is formed into cakes and dried. This is the way in which it is imported.

The colour of Indian lake has not so much brilliancy as that of cochineal; but it appears to be more lasting, if we may judge from the superior solidity of its tint. It is, therefore, probable that the lakes of an inferior brightness, which were used in the earlier times of painting in oil, and which are so well preserved, were brought from India; though, in very early times, the manufacture of this colour was well known in Italy, of which we have evidence in the ancient writers, Cennino Cennini, Armenini, and Paul Lomazzo. Neri, who published his work "*Dell' Arte Vetraria*," in 1612, has described the methods used in his time for preparing lakes of Brazil wood, of kermes, and of madder.

The lake of Brazil wood is very bright, but is not very lasting. I am led to believe that in the picture of the Entombing of Christ, by Titian, the drapery of Joseph of Arimathea has been painted with lake of Brazil wood; for we cannot suppose

that Titian would have preferred a dull to a brilliant tint, where the harmony of the picture would not have been injured. Indeed, the brilliancy of that work would have been increased, if the colour of that drapery had displayed the brightness of our finest lake.

The *kermes*, mentioned by Neri amongst the number of colouring substances used in the preparation of lake, is a gall insect of a globular form, that attaches itself to a species of small oak, which is very common in the south of France and in the central parts of Europe.

Previous to the discovery of America, the *kermes* was used in dyeing purple and crimson; and the oldest pieces of arras tapestry, in which the red colours still retain much of their original brightness, owe that advantage to the durability of the kermes dye: hence it may be inferred that a fine lake might be obtained from this substance. I have tried it without success, having obtained, by the experiment, only a dull crimson; I have not, however, tried either of Neri's methods. The second of them, which consists in dissolving the colouring matter of kermes in weak spirits of wine, holding in solution a small quantity of alum, and then pre-

cipitating the colour by a strong solution of alum, ought to produce a very brilliant purple lake.[1] The use of cochineal, as a dye-stuff, could not have

[1] The following is Neri's process:—

Take some weak brandy; the first portion which comes over in the distillation is to be preferred; put it into a bottle with a pound of finely-powdered alum; into this solution put one ounce of kermes in powder finely sifted; stir them up well; and allow the infusion to remain four days, and then decant the liquid.

Next dissolve four ounces of alum in plain water; pour this alum water into the vessel containing the tincture of kermes, and then pass it through a filter; should the water, after passing through the filter, appear tinged with colour, it must be passed through a second time, then it will come away colourless.

Here follows the original text, as it may be agreeable to some of our readers:

Piglia acqua vite di prima passata; e in un fiasco di essa metti libbra una dì allume di rocca bene polverizzato che vi si disfaccia tutto, poi metti oncia una di Chermesi polverizzato e tamigiato come sopra in tutto, e per tutto, e tutta questa materia sia in boccia di vetro con collo largo, e agita bene il vaso, che l' acqua vite si colorira maravigliosamente, lassa stare per quattro giorni, poi vota questa materia in una catinella pulita invetriata poi piglia onciè quattro di allume di rocca e solvilo in acqua commune e questa buttalla soppra la catinella de acqua vite tinta di Chermesi, e questa buttalla sopra la calza, che stia sospesa sopra una catinella, come si è detto nell' attra Lacco con la cimatura, l'acqua vite colorà della calza, e quanda passasse alquanto colorita, falla passare un' altra volta che pâssera chiara; questa Lacca si cavi della calza, con mestolini di legno puliti, e si metta a seccare in pezze de lino sopra mattoni come l'altra Lacca in tutto, e per tutto, che si averà lacca di Chermesino bellissima, con poca fatica e in maggior quantità assai, tutto provato in Pisa.—*Neri dell' Arte Vetraria*, chap. cxvi.

been known to Europeans until after the conquest of Mexico in 1520; for the invaders at first thought of nothing but exploring the gold mines, regardless of the productions that would be useful in promoting the industry and solid wealth of their country. When, therefore, we see brilliant purple draperies in pictures of the fifteenth or early in the sixteenth century, it is reasonable te suppose that these were produced by madder lake, which, of all the vegetable colours, is the most durable. This species of lake was known to the ancients. Pliny tells us that the *purpurissimum* was prepared by staining with madder a white earth called *creta argentaria*. Count Chaptal having been, in 1809, engaged to analyze some colours found at Pompeii, discovered one of them to be of a fine rose carnation. He soon perceived that it was a lake, exactly like the rose tints of our painted muslins; and he concludes that this antique colour was extracted from madder.

Methods of preparing the Lakes.

The manufacturers commence this process by preparing that which is called "the white body of lake," which is composed of a paste of pure alumine, or of alumine and chalk, upon which the colouring

matter being thrown, fixes itself in a manner more or less durable.

To prepare this paste, a quantity of alum is to be dissolved in water; and this solution is then precipitated by subcarbonate of soda or potass,[1] in the proportion of three parts of good potass to five of alum: it is easy to ascertain whether the whole of the alumine is precipitated without an excess of alkali; when the precipitate has fallen to the bottom of the vessel, some of the clear liquid should be drawn off into two glasses; into one of these is thrown some drops of a solution of potass, and into the other a little alum water; if the precipitation is perfectly formed, no other subsidence will take place in either of the glasses; when the sediment is formed, the liquid is to be drawn off, and the deposit is to be washed with a great quantity of water, until at last it comes off without smell; it is then extended upon a filter of linen to drain, and when it is of the consistence of soft paste, it must be mixed with a warm decoction of cochineal, which colours it more or less strong, according to the quantity of colouring matter contained in the decoction; it only now remains to

[1] Soda is preferable for this purpose. Four parts and a half of this material are required to saturate five parts of alum.

separate the lake from the surplus liquid, to wash and strain it through a filter, to put it into forms, and dry it in the shade.

As it happens that in the preparation of carmine, only a small quantity of the colouring matter is drawn off, and as the decoction from which it is extracted is still full of colouring matter, there is not any occasion to make a decoction of cochineal expressly for the purpose of making lake, as the residue of that used in the preparation of carmine will answer the purpose. This process is founded upon the particular affinity in alumine for vegetable and animal colouring matter; it is well known that alum is one of the best mordents in the dyer's trade. Alumine also serves as a basis for other colours as well as crimson: — for instance, in making yellow lake, it is only necessary to fix the colouring matter of woad, quercitron, Persian berries, &c., upon alumine, or on an aluminous base.

It is of the greatest consequence, that in the preparation of yellow lakes the alum should be pure; for a very small portion of iron is sufficient to injure the colour; and that metal exists in the greater part of the alum of commerce. As for the common lakes from French berries, pure alumine is not used: the white body of these is only fine chalk, to which a little alum is added.

Alum by itself will form a precipitate with the vegetable decoctions: as, for instance, a very strong precipitate may be obtained by adding alum water to a decoction of woad; but it will also precipitate the mucilaginous and gummy matter, which this vegetable contains abundantly.

BROWN PINK.

The drops made from English berries are dissolved with a strong decoction of the berries of Avignon (*ramnus infectorius*): the mixture is filtered, and to it is added a solution of the subcarbonate of soda, one-fourth the weight of the berries; the tincture is then precipitated with a solution of alum, in such proportions as that the alkali shall not be more than half-saturated; it must then be left undisturbed for twenty-four hours; the liquid must then be drawn off, and as it still contains much colouring matter, a smaller quantity of alkali to be added, and it is again precipitated with a similar proportion of alum; the precipitate is then washed, to carry off the salts.

In this process it is clear that one of the essential points is, that the alkali shall predominate. It is owing to this circumstance that the yellow colour of the Avignon berries is turned to brown. By

this process there can be obtained from yellow wood or quercitron bark a brown pink, which will be more lasting than the former.

To the drops mentioned may be given a green colour, by using a solution of copper instead of alum; and I have observed that the mordents from copper render the colours more lasting. In general yellow lakes have little solidity; this is evident in many of the Flemish pictures, where the foliage has become blue from the yellow lake, with which the ultra-marine was mixed, having faded. Rembrandt made much use of this brown sort of pink: the alteration made by time, in the colour when used in a full body, would not be observable; and there is some advantage in using vegetable colours in the shadows, which lose part of their richness by the action of the air, and also because they are transparent, and cannot become black by time; and if mixed with colours which have a tendency to become darker by time, they mitigate it very much.

MADDER LAKE.

This colour is not only the most lasting of all those obtained from colouring matter, but it also affords us the purest reds. I have already stated that it was known to the ancients, and that it was in use in the fifteenth century. To prepare this

lake, Neri tells us "to stain, with madder, some fleeces of wool, and, when they are properly saturated, to boil them in a lye, and then to precipitate the colouring matter with alum."

I believe there must be some error in this description, for the purple colour of the madder is very little soluble by mild alkalies. It must be done in another way; that is, by dissolving with alum water, the colouring matter of the tincture, and then precipitating it with an alkali. By this means I have obtained lake of a very bright colour. I am also of opinion, that in employing caustic potass the fleeces would be dissolved, and with them the colouring matter.[1]

After the introduction of cochineal amongst us, the carmine, and the fine lakes which were obtained from it, caused the use of madder lake to be abandoned, because of its presenting greater difficulties than the former in the manufacturing process. It therefore remained without notice until A.D. 1754, when *Margraaf* discovered a process, which he

[1] I have reason to believe, that if the operation of washing the tinctured wool, was done with the acidulated water, the alkaline lye would eventually dissolve the colouring matter; but more readily with the assistance of heat.

published some years after, and which has since been inserted in the *Encyclopædia*.

This method consists in extracting, by means of alum, the colouring matter of the madder, then precipitating it with sub-carbonate of potass, and washing the precipitate with boiling water, to separate it from the tan-coloured matter with which it is combined, and which spoils the colour. For the proper washing of the madder, Margraaf lays it down as an indispensable rule that the water should be distilled, but this would prevent his process from being executed on a large scale; but water slightly alkaline may be used, instead of distilled water, as it will dissolve the greater portion of the fawn-coloured matter, without sensibly attacking the purple colour. I have tried it, and have succeeded in preparing, by this method of clearing it, a very fine lake of a blood colour; and I am persuaded that it may be obtained of a still finer quality. I have not followed up this experiment, because, by the following method, I have the means of preparing lake of a pure red, which presents no other difficulty than the necessity of using a very great quantity of water.

This mode is founded upon the degrees of solu-

bility in the colouring matters, which in the madder are united to the purple tint, and from which it must be detached ere a pure colour can be obtained.

There are two of those quite distinct; one is the fawn, the other the violet colour.

The first, which is the most abundant, dissolves readily in water, especially if it be alkaline water. The purple colour is not sensibly affected, even when warm, by the alkaline sub-carbonates, and it is soluble in alum water: these results point out the means of separating the pure red from the fawn colour, by which it would be tarnished.

When the madder is boiled in water strongly impregnated with sub-carbonate of soda, it will give out a great quantity of colour, of as intense a brown as a strong decoction of coffee, and which does not appear to contain any purple tincture, for alumed cotton steeped in it takes only the nankeen dye.

If this is passed through a filter, the water still retains much colour; by continuing to wash it, the water comes away clear at last, but it requires a prodigious quantity of water before this appearance takes place. At this point, if warm water be em-

ployed, it will still dissolve a large portion of the fawn-coloured matter.

In proportion as that substance is dissolved, and carried off by the water, the filter assumes a violet-coloured appearance as well as the madder. Water acidulated with muriatic acid dissolves this colour, and changes it to the dull orange tone it had before it was washed. The liquor which at this time filters from it is of a clear yellow, and alkali precipitates from it a dull violet colour, similar to that which cotton takes in a madder vat when a solution of iron is used as a mordent instead of alum.

In this precipitate the violet colour is fixed upon a calcareous base, derived, no doubt, from water used in washing it, and even from the madder.

After two or three repetitions of throwing upon the filter some more acidulated water, the liquor which runs off will cease to contain any more calcareous matter, and scarcely any precipitate takes place with the alkalies; but its yellow colour becomes changed into crimson, of a tint more or less deep and brilliant. Alum throws down a violet precipitate.

If, when as much as possible of the fawn and violet-coloured tints have been carried off by wash-

ing, a warm solution of alum is thrown upon the madder, in a short time you will perceive the filtration coming away of a bright scarlet colour, from which the alkalies precipitate a rose-coloured lake, more or less deep in proportion to the alum employed.

It is not requisite that the alum water should be warm; but if used cold, it will require twenty-four hours at least to dissolve all that is soluble of the purple matter.

The washing will not carry off all the impure matter; besides, they are soluble in alum water. This is the cause why the first filtration gives the most brilliant lake; and if the filtrations are arranged in succession, as drawn off, the last one will be the palest, and most affected by the fawn-coloured matter.

From this view of the process, it would appear that nothing could be more easy than to prepare, on a large scale, fine madder lake, and that it only required to set up a filter of sufficient dimensions to admit of a great quantity of fine madder to be washed at the same time, to separate it from the different substances by which its brilliancy would otherwise be very much diminished.

But we should be stopped very soon by a diffi-

culty, against which it is of importance to be provided. Madder contains such a quantity of gummy and saccharine matter, that the first wash from it forms a sort of jelly. If it be not diluted by a great quantity of water, the drainage becomes slack in proportion as the water cools, and the filtration finally ceases altogether.

The stoppage may be prevented by throwing the decoction upon a fine cloth, and expressing the jelly by twisting the cloth hard; when this mucilage is squeezed out, the cloth is opened, and boiling water thrown upon it, which also is wrung out in the same manner. Two washings seem sufficient to carry off all this impurity, and the filter will then permit the liquor to run freely.[1] Besides, it can be arranged so, that the water shall penetrate all parts of the madder under strong pressure, by the following apparatus: a vat of deal should be prepared, in size proportioned to the quantity of madder to be washed, but rather broad in proportion to its depth; at the distance of nearly two inches from the bottom an osier hurdle should be placed, and covered with a felt, or cotton cloth; the shape of

[1] At this period, if the madder be diluted in water acidulated by muriatic acid, the flowing of the liquid will be accelerated.

this basket-work should be exactly fitted to the sides of the vat.

Upon this species of diaphragm is to be placed a couch of madder, which ought not to be more than seven or eight inches in depth; for the washing will be less difficult if the water has only a thin body to penetrate.

To keep the madder in position, it must be covered with a second diaphragm, composed as the first, and with a border of some fine stuff, which will allow the water to pass quite free; this second osier flat must be firmly fixed by cross pieces of wood, retained in their places by wooden pegs; it is upon this surface that all the pressure of the water rests.

At the top should be placed a stop-cock, to let the water flow; another should be placed at the bottom of the vessel, to allow of the water being drawn off, when the washing of the madder is completed.

The water is to be introduced at the bottom of the vat, by means of a leaden pipe, with a diameter of five or six inches; and the aperture at the top, by which it is drawn off, should be in proportion to the quantity admitted below. The leaden tube is made to descend from a reservoir, placed as high

above the vat as the localities will admit, and the pressure may require.

We know that the specific gravity of liquid is in the ratio of its base multiplied by the height of the column; thus whatever may be the diameter of the vat, each grain of madder will be pressed by the small column of water contained in the tube, with equal force to what it would give, were the tube of the whole diameter of the vessel: the washing conducted in this manner, is completed in a shorter time than the other, and with a smaller quantity of water.

There must be a small tube in this apparatus, from the bottom of the vat, to extend upward above the upper spigot; it may be of glass, and is intended to let off the air when the water is admitted into the vat.

Observations.

The sulphuric and muriatic acids, when diluted with water, do not sensibly affect the fine red colour of madder; they therefore may be employed to separate the brown colour with which it is tarnished. By boiling madder in water tinctured with sulphuric acid, the mucilage is converted into a saccharine substance; this prevents the

filters from being choked up in the operation of washing the colour, but it does not shorten the operation; at all times the acids act upon the red colour of madder, in a way that may be turned to account. Lakes prepared by acid washes approach much nearer to the scarlet than the crimson tint, and therefore are preferable in the carnations.

The process just described, requires a great deal of water and much time. M. Robiquet has described another method, in the *Dictionnaire Technologique*, and in *Les Annales de Physique et de Chimie:* by means of this process, a very fine lake may be prepared in a few hours; the process consists in steeping the madder in four times its weight of water, and in macerating it well for ten minutes, then submitting it to the action of a powerful press; the first wash is set aside, to enable the operator afterwards to separate the colour from the coagulated matter, which forms in a very short time; the mass is then subjected a second and a third time to the action of the press: these three washings complete that part of the process; the madder, however yellow it may have been, has at this period assumed a dark rose colour; in this state it is exposed to the action of alum

water, for which purpose it is again steeped in five or six parts of water, to which half a part of pounded alum is added; this mixture is heated gently, and macerated for two or three hours; it is next poured out upon a fine cloth, then put under the press; the whole of the washings are then filtered through paper, and precipitated by a weak solution of the crystals of soda, but care must be taken not to add so much of it, as to precipitate all the alumine at once; it would be well to divide the quantity into three portions, and thus obtain three precipitates, each of the two latter decreasing in strength of tint, the first drawn off being strong in proportion as it has been a longer time kept agitated; the precipitate being complete, nothing more is to be done but to wash it, by merely decanting it, until the water comes off quite clear.

M. Robiquet has performed these operations before me, and the lake produced, which I saw made, was of a very fine quality. I endeavoured since then to repeat the experiment which I had witnessed, but not having a press of great power to assist me, I did not succeed in disengaging the fawn-coloured matter even after six washings, and the lake I obtained was not of a pure rose colour.

The process of M. Robiquet appeared to require some modification. In the first place, the mucilaginous liquid, extracted by great pressure, contains evidently a quantity of fine colour, which it would be difficult to separate from it, while on the contrary the alkaline decoction, which I prefer, does not contain any appearance of colour; then again, his manner of washing does not carry off so much of the buffy matter, as the repeated ablutions I have used, as appears from this, that if the whole of the tincture prepared by the alum water is precipitated, the lake so produced will be impure.

But to conjoin both of these modes, would be I think an advantage, and I should commence by boiling the madder in a solution of the subcarbonate of soda, and then by the pressure to accelerate the washings: I have succeeded in preparing, in the space of two hours, a small quantity of very fine lake, by spreading the alkaline decoction upon a fine cloth, and then twisting it firmly for a moment, then opening the cloth and throwing on the mixture some hot water; after eight of these washings repeating the pressure, I have used the cold acidulated water of chloric acid, and afterwards pure water; some fine colour no

doubt has escaped through the cloth, but this may be collected by allowing the water to deposit this matter.

The same chemist has published another method, which is founded on the principle, that the purple colour of the madder cannot be altered by the concentrated sulphuric acid, unless at a high temperature; the acid carbonizes the brown extractive matter, and renders it insoluble, it only then remains to remove the acid by repeated washings.

The great difficulties in this process, as the author acknowledges, arise from not knowing the proportion of acid to be used, and this can only be found by repeated and cautious experiments: of two attempts which I made, neither was successful; in the first of them much of the colouring matter was destroyed; and in the second, even with repeated washings, I could not remove the brown colour which had not been completely carbonized.

I have substituted the hydrochloric for the sulphuric acid, I only used enough to attack the fibrous and mucilaginous substances; the ablution required as much time as in the former method, but the lake produced was much brighter than that produced with the sulphuric acid; it appeared to me

that the degree of heat sufficient to convert the solid matter into a gummy state could be made useful: this conjecture has been justified by experience, the alkaline decoction is no longer transformed into jelly, and the washing is no longer impeded by the filter being choked up.

The Qualities of Madder.

The madder known in commerce as "extra-fine," which is composed only of the woody part of the root, is that from which the best lakes are produced, and in the greatest quantity.

In those districts where it grows spontaneously, or where it is produced by cultivation, the roots, when fresh, may be used with great advantage. After being well washed, they should be sliced up, and bruised in a wooden or marble mortar, and then boiled in a solution of sub-carbonate of soda, after which the washing process is carried on as described.

The waters to be chosen.

In the choice of water the softest is the best; and where it happens that one has only at command water containing calcareous salts, these must be precipitated by a little soda or potass, for the alkaline

carbonates do not dissolve the purple tint of the madder; after this, boiling water should be used, which will carry off a great portion of the buffy matter. Of course the operation would be shortened by commencing to wash with boiling water.

Upon the violet-coloured substance, and the action of the acidulated water.

The violet-coloured matter is the least abundant of the colouring substances contained in the madder. It is not soluble even in warm water; but as it is soluble in alum water, and as it is proper to separate it, this operation can easily be done by water lightly acidulated by hydrochloric acid, which does not produce any visible effect on the purple matter.[1]

The perfect resemblance of this colour to that which the mordent, "acetate of iron," gives to cotton cloth, may induce the belief that this is owing to the iron pestle used in pounding the roots of the madder; but the same violet-coloured scum is found when the roots are fresh gathered, and bruised in a mortar of porcelain, without any instrument of

[1] It will dissolve a part of it, and change the tint of the lake to an approaching scarlet, which proves that it is intended to have a crimson lake; the acid wash must not be used.

iron being used. It may be obtained in sufficient quantities, and pure, by steeping the dry roots in water; in a few days the water, strongly charged with brown extractive matter, is covered with a pellicle of a violet colour. This can be easily separated from the water; if fresh water be added to the madder, a similar appearance soon takes place: continuing this treatment, a sufficient quantity of this colour will be collected to allow of examination.[1]

It is so liable to the action of acids, that alum changes it immediately into a dull orange red: the hydrochloric acid turns it to an orange yellow.

The effect of the acidulated water is not restricted, however, to dissolving the violet-coloured matter; it also renders more soluble in pure water the other colouring matters contained in madder; for when, after washing for a long time, the buffy matter is supposed to be carried off, and then, after the acidulated water is used, plain water be applied, this water will run off the filter more coloured than it did before the acid was used; and if hot water be employed, a great quantity of purple

[1] It may be that this substance is produced by fermentation, but at all events it must be got rid of, as it would, in such a case, have the same effect in tarnishing the lake.

feculæ will be dissolved; and if a piece of cotton cloth be placed under the filter, it will soon be seen tinted with a bright rose colour. I have thought it my duty to mention these particulars, as they may lead to some useful result in the art of dyeing.

On the precipitation of Lake.

For this purpose, the sub-carbonates of soda or potass may be employed; if the latter, it should be exposed to the air long enough to allow it to absorb the quantity of carbonic acid with which it might be saturated by its contact with the atmospheric action. When the caustic alkali is used, the lake is very dark when dry, and is also very hard, resembling enamel in its fracture; finally, when reduced to powder, it is very pale. On the other hand, when the alkali is much carbonized, the lake has not much intensity, is brittle in the fingers, but when ground with oil or gum it becomes much stronger.

Lake may also be precipitated with borate of soda: this precipitates only a portion of the alumine; and this is useful, particularly when the washing has not been carried on to its full extent. I have obtained by this means very good lake,

which had been only two days exposed to the washing process; I had only precipitated one-half the alumine solution: this lake was glossy and nearly black when dry, and when ground in water it remained pulverulent; combined with oil, it had great intensity.

Whatever kind of alkali is used in precipitating the purple substance of the madder, it will be better not to throw down the whole of the colouring matter; the portion of buff colour which has been detached by the alum, remains floating in the liquid, and the precipitate is fine in proportion to the smallness of its quantity. Thus by dividing the precipitates, various sorts of lake are obtained, the intensity and brilliancy of which, after the first or second washing, decrease considerably, but which are very useful in places where the bright reds are not required.

Although alum has a great affinity for the rose-coloured portion of madder, yet it will only dissolve a part of it at a time, and I have not succeeded in concentrating, by evaporation, that solution to give it strength sufficient to make red ink; it is also difficult to produce lake of a pure and intense red from madder. The only method I know for this purpose, is to draw off the portion

of alumine which is in excess: caustic soda has the power of dissolving the alumine without touching the colour; it only changes it to a crimson, but that tint is destroyed by washing in pure water: with the washing containing the buffy matter of the madder, and a very small portion of bright colour, it is easy to prepare brown lake, which may be used as the yellow lakes. These waters may thus be rendered useful, by collecting in one vessel the alkaline waters, and the acids in another, to which should be added the residuum of the solutions obtained by the alum not completely precipitated: the clear parts of these waters are to be drawn off, and one is to be precipitated by the other. They are then washed until the water comes clear away; this will carry off, along with the salts, a portion of the gummy matter remaining in the precipitate.

On the adulteration of Madder, and the means of detecting the fraud.

We have shown that in the ordinary preparation of lake, the method is to form an aluminous paste called "the white body," which is afterwards coloured with the tincture.

This points out a ready way of adulterating the lake of madder, since only a little of the tincture

is required to give a rich appearance to a substance, that on trial would be found very weak and pale; it is then to be feared that some manufacturers would yield to the temptation of adulterating the lake, were it only to make up for a failure in the process. I have too much reason to believe that this apprehension is well founded. I have boiled, in pure water, lake bought in England[1], the purity of which I suspected from its intensity and crimson tint: the water carried off part of the colour, and plainly discovered the fraud; but had the trick been better done, this method would not have detected it.

The true colour of madder lake is that of the finest red of our printed cottons: if it look crimson, there is reason to fear that it has been mixed with some other substance; yet when in separating the buffy matter, there is employed towards the close, some alkaline water, the lake has a tint of crimson, even after the washing with acidulated water has ceased.

When the purity of madder lake is still doubtful, it is better to employ such tests as will enable us

[1] I have had samples of lake sent me from Berlin, under the denomination of "carmine madder," and which evidently owed their brightness to the tinctures of cochineal.

to judge, whether it contains any other colouring matter. The alkaline carbonates do not dissolve the colouring matter contained in the madder roots; for a good reason, they cannot affect it when combined with alumine.

If therefore a small portion of the lake to be essayed, is boiled in a weak solution of carbonate of soda, and then thrown into a filter and well washed; if after this it has lost its brightness, and if the alkaline water of filtration is coloured, there is good reason to suppose that the colour has been adulterated.

RED OXIDES OF IRON.

RED OCHRES.

The appellation of brown red, which has been given to the red oxide of iron, is quite correct; it is in fact a red colour somewhat lowered by a tint of brown.

We often find this colour ready formed by nature; if by some means the water is evaporated which was in combination with the oxide of iron, the latter becomes hydrate of iron, and changes to the red colour.

The rust of iron offers an example to us of this change of colour: this rust, which is at first of a

yellow ochre tint, turns brown on exposure to the air, and in time becomes red.

The greater part of the brown red used in painting, is made from yellow ochre calcined; it is supposed that on the purity of the ochres depends the brightness of the red thus obtained. Very fine brown red is also made by calcining sulphate of iron. Commerce has long supplied the arts with this colour, which is made from sulphuric acid, prepared by the decomposition of sulphate of iron: the residuum is a red oxide, more or less violet according as the action of the fire has been more or less prolonged. This colour is not only valuable for its lasting qualities, but also for the fine carnation tint which it produces with white: and we perceive in the works of Titian, Vandyck, and others, who have approached nearest to nature, that it is very much employed.

PURPLE COLOURS.

Painters usually mix blue and lake to make this colour, but we see in the article on lakes that it may be prepared differently. From purple of cassius, violet tints may be obtained, less brilliant, but more lasting than those from the lakes.

This purple of cassius is a combination of the oxides of gold and tin: until lately it had been used only in works of enamel; but by combining it with alumine, and calcining it in the same way that is practised with cobalt, a violet colour will be produced, which is found very useful in oil. I have given it a test, and found that though exposed a year to the action of the sun's rays, no sensible change took place.

Purple of Cassius is prepared by mixing together weak solutions of muriate of gold and muriate of tin.

The gold is first dissolved in nitro-muriatic acid, and the solution evaporated almost to crystallization, to disengage it from the excess of acid, which would discolour the precipitate; this saline mass is again dissolved in distilled water, and then mixed with a solution of protoxide of tin. The mixture is now a violet colour, and remains a long time without precipitation, but a single drop of the sulphate of iron causes an instantaneous precipitation.

The precipitate being well washed, is mixed with alumine in a state of jelly, and then calcined.

TRITOXIDE OR PURPLE OXIDE OF IRON.

Iron at the highest point of its oxidation takes

the violet tint: the colour is dull but permanent, and except the purple of cassius just described, it is the only purple that can be used in fresco.

BLUES.

COBALT, ARSENIATE AND PHOSPHATE OF COBALT, AND ALUMINE.

The high price of ultramarine, and the fading nature of the other blues, made it an object with artists to obtain a colour cheaper than that drawn from lapis lazuli, and equally bright and lasting. This important discovery was made by M. Thenard, in 1802; he had been directed by Count Chaptal, then minister of the interior, to attend to the interests of the artists, and to make such researches in and experiments for the improvement of colour, as might be required of him; he succeeded in obtaining a bright and solid blue, by calcining a well-combined mixture of alumine, with crystals of cobalt. The arseniate, the borate, or the phosphate of cobalt may be employed; but the latter in preference, for it produces the purest colour. The arseniate has always a sort of violet tinge, more visible by lamp-light than by day. These blues are thus prepared.[1] Take of the mineral cobalt of

[1] See Thenard's Chemistry.

Tunaberg, which is composed of cobalt, arsenic, iron, and sulphur; after being pulverized, it is calcined until the vapours of arsenic are quite dissipated; it is then dissolved by an excess of nitric acid; the solution is then evaporated nearly to dryness, the residuum is then dissolved in boiling water; this liquid is then filtered to separate from it a portion of arseniate of iron, which is deposited by this operation; the clear liquor is then treated with a solution of the sub-carbonate of soda, and sub-phosphate of cobalt is obtained.

The precipitate being well washed, is taken from the filter, moist, and mixed as well as possible with eight times its weight of alumine jelly; that is in the state in which it is found; when after being precipitated from a solution of alum by an excess of ammonia, it is well washed with very pure water, and passed through a filter. The mixture intimately blended, is then to be dried[1]; when hard enough to be broken, it is put into a crucible, covered up, and heated by degrees to a cherry red, leaving it in the same temperature for half an hour; the crucible may now and then be uncovered cautiously, to remove a little of the colour for trial;

[1] When dried in the open air, it is more brilliant than when dried upon the stove.

when the proper tone is developed, the crucible is to be withdrawn: the greatest care must be taken that not a particle of organic matter shall fall into the mixture, as it would carbonize, and combine with a portion of the metal. If instead of phosphate of cobalt, arseniate was used, the proportion of alumine must be doubled, or sixteen parts of alumine to one of cobalt. These crystals may be equally obtained by treating the mineral cobalt by nitric acid, as we shall show, and by using a solution of arseniate of potass, instead of that of the phosphate of soda.

EGYPTIAN BLUE (USED BY THE ANCIENTS).

This colour, which is very brilliant, is frequently found on the walls of the temples in Egypt, and also on the cases enclosing the mummies. The same colour is found in the ruins of some ancient edifices in Italy, and even some of it has been discovered in the state it was made by the manufacturers for the painters in those remote times.

Count Chaptal analysed some of it, found in 1809, with several other colours, in a shop at Pompeii. He found that it was blue ashes, not prepared in the moist manner, like that which the paper-stainers

use, but by calcination. He considers it a kind of frit, the semi-vitreous nature of which renders it proof against the action of the acids and alkalies at a moderate temperature.

Some years later, Sir H. Davy employed himself in Italy by making researches to ascertain the preparations of the colours used by the Greeks and Romans; and he obtained similar results; and further, by employing the synthetic method, he obtained a colour similar to that of the ancients, by exposing to a strong heat, for two hours, a mixture of fifteen parts carbonate of soda, twenty parts of powdered flints, and three parts of copper. He thinks this is the blue described by Theophrastus, who has ascribed the discovery of it to a king of Egypt, and that it was manufactured at Alexandria.

Vitruvius, who calls this blue *cæruleum*, informs us that the art of making it was brought by Vestorius from Egypt to Puzzuoli, and that it was made by calcining, in a potter's furnace, balls made of sand, filings of copper, and flos nitri (carbonate of soda).[1] I am inclined to believe, that the Vene-

[1] Arena enim cùm nitri flore conteritur adeò subtiliter ut efficiatur quemadmodùm farina et æri cyprio limis crassis (ut scobis) facto immixtu conspergitur ut conglomeratur. Deindè pilæ manibus versando efficiuntur, et ità colligantur ut inarescant. Eæ

tians, who were so skilful in enamelling, knew how to prepare the Egyptian blue. Neri, in his treatise *Dell' Arte Vetraria*, describes different degrees of oxidation of copper, which gives these different colours, viz. red, green, and blue, and the *color Arabico detto Turchino.*

I imagine that Paul Veronese has employed this sort of blue in many of his pictures in which the skies have become green. The blue ashes, as we prepare them, would have experienced this change in a few weeks; while the Egyptian blue, which has remained almost without alteration as employed in distemper painting, would not for a long time become affected by the action of oil. Had Paul Veronese employed our blue ashes, he would soon have discovered their want of solidity, and would not have exposed his works again to similarly injurious changes.

Although it appears to me that this colour ought not to be employed in oil painting, yet it is much to be wished that we could recover the method of

aridæ componuntur in urceo fictili: urceus in fornace ponitur, ità ut æs et ea arena, ab ignis vehementia confervendo cùm coaruerint inter se dando et accipiendo sudores, à proprietatibus discedunt, suisque rebus per ignis vehementiam confecta cæruleo rediguntur colore.—*Vitruvius*, book vii. chap. ii.

making it, as in distemper and decorative painting it would be of great utility.[1] One remarkable effect of this colour is, that by lamp-light it appears somewhat greenish, whilst by day it shines with all the brightness of azure: cobalt, on the contrary, becomes violet by artificial light.

BLUE ASHES.

This is a precipitate of copper, combined with water (a hydrated carbonate): it is either natural or artificial. It is only employed in decorative painting; and turns green after some time when used in distemper. The same effect will be produced on it in a few days, if ground up in oil.

In preparing this colour they begin by making what are called "green ashes," by precipitating, by carbonate of potass, a solution of sulphate of

[1] In Erdman's *Journal de Chimie*, Leipsic, 1822, the author assures us that he had succeeded in obtaining the finest blue, by means of glass coloured by copper green. This substance was reduced to powder, then mixed with nitrate of potass, and then submitting the mixture to a heat not strong enough to melt it; when it has combined intimately, the colour has become blue; but if fusion had taken place, the matter would have been green.

One thing is surprising; it is that the spungy mass does not contain any more alkali in a free state, and is hardly touched by the acids. When it is finely ground, it produces a brilliant celestial blue.

copper. The manner of doing this is very important: if the temperature be too high, the precipitate becomes crystallized in large grains like sand; if it be too low, the precipitate is pasty, and too pale; and during the operation, should the heat, from being too elevated, become very low, one part will be found heavy and granular, the other will be pale and light.

This carbonate of copper is converted into blue by mixing it with lime and sal ammoniac thus: take twenty-four pounds of this precipitate, well washed and filtered, two pounds of good quick-lime, and about ten ounces of sal ammoniac; the lime is then to be slacked to a milky consistency, and made very smooth; the sal ammoniac, reduced to powder, is then added to it, and they must be well stirred, to unite them properly. It is allowed to cool as much as possible previous to mixing with it the carbonate of copper; for during this operation the temperature rises considerably, and should it reach to twenty-five degrees the hydrate would be decomposed, and a black oxide would be formed, instead of a bright blue. Either we should have a grey, or a bluish grey colour. The mixture is allowed to settle for twenty-four hours, and is then washed in plenty of water.

PRUSSIAN BLUE.

This colour takes its name from the country wherein it was discovered by accident in 1704. It happened that a manufacturer named Diesbach was engaged in precipitating a solution of alum, to prepare the white body (as the basis of lake) to be coloured with a decoction of cochineal, employed for that purpose some potass which had been given him by Dippel, and upon which the latter had several times rectified animal oil; but, to the astonishment of the operator, the precipitate, which should have been white, became blue.[1] Dippel being made acquainted with the phenomena, applied himself to examine all the circumstances connected with this strange appearance, and at last he succeeded in reproducing the new colour at his pleasure. The method of preparing the colour, which was kept secret by the inventors, was an object of research for many years among the chemists. In 1724, Woodward, who was a member of the Royal Society of London, published the following process,

[1] There is no doubt but that the alum employed by the manufacturer on this occasion, was like the Liege alums mixed with sulphate of iron: and it is to the presence of this metallic salt, that we must ascribe the sudden developement of the blue colour.

which has been for a long time the only one in use :—

Some dried ox-blood and potass are mixed together and calcined; as soon as the vapours have ceased, and the substance has become of a dark red, it is thrown into water and boiled, to hasten the solution of the salts it contains. With this liquid, clarified by rest or filtration, is precipitated a solution of sulphate of iron and alum; the precipitate is then purified by hydrochloric acid and repeated washings. At the present time, instead of the Prussian lye, the crystals drawn from it, and called prussiat of potass, are used. This salt is a triple combination of Prussic acid, potass, and a little iron: the solution being much more pure than the lye in which it crystallizes, the blue should be, and is in fact, much more brilliant. If this colour possessed solidity, it would be one of the greatest utility: it has intensity, flows freely in the pencil, and is a good dryer; but it loses its brightness, becomes greenish and grey when exposed to a strong light: therefore it never can be used to make green tints of a brilliant and durable nature. In the article on browns we shall show, that Prussian blue, exposed to a strong heat, becomes an excellent brown. When Prussian blue is prepared

with proto-sulphate of iron, the precipitate is first of a dirty green, and only becomes blue by contact with the air. It must therefore be well stirred; and when the blue is developed, it is washed by decanting or filtration. When the sulphate of potass is carried off by washing, the colour is soluble in water, and holds the same quality when dry; but this will not be the case if alum has been added to the sulphate of iron, or is contained in it.

ULTRAMARINE.

This substance, which is one of the most brilliant colours of the palette, is also one of the most lasting. It is produced from lapis lazuli (lazulite), a hard species of stone, found in Persia, China, and Great Bocharia. The stone is not uniform in its colour; it often has white veins like marble, and is sprinkled with points and veins of a golden lustre. There are also ferruginous pyrites in it; that is, combinations of iron and sulphur. Having chosen portions of this stone most free from veins and pyrites, it is only requisite to reduce it to an impalpable powder, when it forms a fine blue colour. Probably this was the original mode of preparing it before the discovery of the process by means of

which the colour is separated from other matter which would tarnish it.

The lazulite is first broken into small pieces, to give an opportunity for cutting away, with steel scissors, the white veins that may be found; all the parts that are of a fine colour must then be put into a crucible, and brought to a red heat; and when the matter is in this state, it is to be thrown into cold water.

As the lazulite will sustain a red heat without changing colour, the object of the operation is to facilitate the trituration of the stone. The pieces are then taken out of the water, then pounded in an iron mortar, passed through a sieve, and ground with water upon porphyry or glass: a strong tenacious paste is thus formed; this is dried, and produces a blue powder, more or less tinged with grey, according to the quality of the stone. This powder is then intimately blended with an equal weight of resinous paste, composed of new wax, Burgundy pitch, gum mastic, turpentine, and linseed oil, in such proportions, that when the powder is combined with it, the paste shall still continue pliant and manageable. This mixture, of course, must be united by heat, and the melted mass is then thrown

into a dish full of water. It is kneaded at first with two spatulas of wood, and with the hands when it is cold enough for that purpose. It is formed into rolls, which are put into a vessel full of water, where they must remain fifteen days, renewing the water occasionally: this process causes a fermentation, by which the oxide of iron from the decomposed pyrites adheres still more closely to the mastic, in the same degree that the blue powder of the lazulite separates from it. The paste is then pressed in a close vessel of water, when the ultramarine exudes, and colours the water.

The first issue of the colour is the most brilliant: for this reason the products are divided into three or four different classes, or grades of strength; but when no more colour can be gained by cold water, another issue can be obtained with the aid of warm water. When at length nothing further can be procured in this way, the addition of a little soda to the mastic will draw out what is called the ashes of ultramarine, which is a mixture of a small portion of the mass, a little oxide of iron, and a small portion of the colour, forming a grey, of a more or less bluish tint. The ultramarine is then washed in boiling water, which carries off a little of the

resinous matter mixed with it, and which lowers the brightness of its tone.

Although this colour can sustain a red heat without losing any colour, yet it may be destroyed by acids, which give the means of ascertaining its purity in the following manner: a pinch of this colour being put into a glass, and some nitre thrown upon it, the blue colour is destroyed in a moment, only an earthy matter remaining, of a yellowish grey colour, and the appearance of jelly. Neither cobalt nor Prussian blue are changed by the acids, so that, when ultramarine is adulterated by one of these articles, the fraud is easily discovered. A solution of indigo is not bright enough to tempt any one to use it in the fabrication of ultramarine; but should it be attempted to heighten the tone of ultramarine by this substance, the sulphuric acid will soon discover it, as this acid does not act upon indigo.

It was believed for a long time that ultramarine owed its colour to iron; but MM. Clement and Desormes, having had a great quantity of lazulite at their disposal, have, by repeated washings and purifications, succeeded in preparing ultramarine quite free from iron, and have found it in the proportion of twenty-two parts to one hundred of soda, a circum-

stance not at all suspected. On the other hand it has occurred, that in demolishing some furnaces employed in making soda, by means of decomposing sulphate of soda, some of the earth was found impregnated with a light blue, pieces of which earth, coloured in like manner, were sent to M. Vauquelin in 1814. He found, on analysing them, that the resemblance to ultramarine was so strong, that he no longer doubted the possibility of imitating nature in producing that fine colour. To realize these hopes soon, it was only required to give a stimulus; for in the present advanced state of science this discovery could not have been very long delayed. This encouragement has been afforded by the Society for Promoting Discussions in Science. They offered a premium of 6000 francs (£500 sterling) to any one who should succeed in making ultramarine, by artificial means, equal in every respect to that made from lazulite. The problem has been completely solved by M. Guimet, formerly a student of the polytechnic school, and at present commissary of powder and saltpetre to the government.

The ultramarine he has made, is identically the same in appearance and all other qualities as that manufactured from lapis lazuli. There are

epochs, when certain discoveries are, as it were, become ripe for action, so that they are developed in different places at the same time; such a circumstance has happened with respect to the new ultramarine. At the very time that M. Guimet found out this new method, M. Gmelin, professor of chemistry at Tubingen, was engaged in a similar discovery, and with very similar results.

The announcement of M. Guimet's success deprived M. Gmelin of that priority of claim and reward, which he had good hopes of obtaining; he determined to establish his claim to originality of invention, by publishing the following account of the process.

You must begin, says the professor, by preparing hydrate of silex and alumine; the first in melting together some well-pulverized quartz, with four times its weight of the carbonate of potass; then dissolving the melted mass in water, and precipitating it with muriatic acid.

The alumine is made by precipitating pure alum with ammonia; these precipitates should be carefully washed with boiling water. After this is done, the quantity of dry earth in each of the two hydrates must be determined, by bringing to a red heat a certain portion of each of the moist precipi-

tates; the hydrate of silex which he has employed in every hundred parts, contained fifty-six, and that of alumine three hundred and twenty-four parts of hydrated earth: dissolve warm, in caustic soda, as much silex as it will retain, and fix upon the quantity of dissolved earth to be used; take twenty-two parts of the latter, a quantity of hydrate of alumine, which contains seventy parts of dry alumine; this is added to the solution of silex, and the whole evaporated together, stirring it constantly until it becomes a dry powder.

This combination of silex, alumine, and soda, is the basis of ultramarine. This should now be coloured with the sulphuret of sodium, which is made as follows:—

Into a Hessian crucible, with a close cover, is to be put a mixture containing two parts of sulphur, and one of carbonate of soda hydrated; this is heated by degrees until it attains a moderate degree of redness; the mass, being in a state of fusion, this mixture is thrown into it by slow degrees; as the watery vapours cease, another portion is added; having kept the crucible in a moderately red heat for an hour, it is taken from the fire and allowed to cool; it now contains ultramarine, mixed with an excess of sulphuret of sodium; the latter

is separated by water; if there be excess of sulphur, it can be carried off by a moderate heat: should all the parts not be equally coloured, the finest of these can be separated from the rest by washing the mass in water, after being finely powdered.

This process, which I have extracted from the *Annales de Chimie et de Physique*, tome xxxvii. p. 411, has been repeated by several of our chemists, and with success; but the colour obtained was not so brilliant as it ought to be: for the mass of frit drawn from the crucible was not of an equal tint; some parts being pale, others intense and of different shades, some inclining to the greenish, others to the violet tint. This process, therefore, decidedly requires some modification: as the mixture of the materials was evidently unequal. Perhaps this might be better accomplished after taking the mixed mass from the crucible, then reducing the different shades of ultramarine to a fine powder, and subjecting it again to the action of the fire in a close vessel.

Whatever imperfection may appear in this process, it is my duty to give it publicity, as I am persuaded that it will not fail to afford the best results to those who will persevere in carrying it towards

that degree of perfection of which I think it capable.

GREENS.

Besides the green tint composed from the simple union of yellow and blue, there are others formed either by nature or by chemical combinations, such as malachite, oxide of chrome, green earth, mountain, Scheele's and Vienna green.

MALACHITE, AND MOUNTAIN GREEN.

These two substances are carbonates of copper: the first is found in solid masses, formed by the constant dropping of water saturated with carbonic acid, and holding in solution the oxide of copper. The carbonate is thus formed in bulbous masses, the shades are more or less intense, but always of a bright green.

The hardness, as well as solidity of the malachite, is sufficiently demonstrated by the great number of valuable objects which for ages have been wrought in this material, and which have not lost any of their lustre. It is not unlikely, that from the commencement of painting it has been ground up and used as a colour.

Mountain green, in like manner, is only a carbonate of copper, and being found naturally formed, in the state of a fine powder, the artists have always had it ready prepared to their hands, and no doubt soon took advantage of it. We see, in the most ancient miniature pictures, green in a perfect state of preservation, which evidently are the natural carbonates of copper.

It is prepared artificially, by precipitating, with the sub-carbonate of soda or potass, a solution of copper; the result of this is an opaque colour, of a greyish or pale tint, which is used in decorative painting. It is not near so bright as the natural carbonate of copper: but it is probable that it could be obtained quite similar to it, if the carbonic acid could be combined with the oxide of copper in any other way than by the double decomposition of the carbonic alkalies and the solutions of copper.

OXIDE OF CHROME.

This pigment exists perfectly formed in a natural state; but hitherto it has been found in such small quantities that the supply is not sufficient for the demands of art. That commonly used in painting is an artificial production, which is obtained from the decomposition of chromate of mercury by

the action of heat.[1] For this purpose the chromate is placed in a small graduated retort, which is filled with it in the proportion of from two-thirds to three-quarters of the vessel's dimensions; this is placed in a reverberatory furnace, to the neck of which a tube is attached, and to the outer end of this tube is fixed a sleeve, or bag of linen, which is plunged into water to facilitate the condensation of the mercury as it volatilizes. By slow degrees the retort is brought to a red heat; the chromate of mercury is then decomposed, and changed into oxygen, mercury, and oxide of chrome; the oxygen disengages itself in the state of gas; the mercury passes across the linen, and condenses; the oxide of chrome remains in the receiver; and, after a strong heat of three quarters of an hour longer, the operation may be considered complete.[2]

M. Delasaigne has discovered a process more facile and economic than the preceding for producing this oxide of a fine green colour, and of a uniform intensity. His method consists in calcining, in a close crucible, and at a red heat, equal

[1] The chromate of mercury is prepared by a double decomposition similar to that of the chromate of lead; that is, by precipitating by the chromate of potass a soluble mercurial salt, such as the proto-nitrate of mercury.

[2] See Thenard's Chemistry, vol. ii.

parts of chromate of potass and of sulphur; then to wash with lye the greenish mass produced, to dissolve and carry off the sulphate and sulphur of potass formed by the operation: the oxide of chrome then precipitates, and is obtained pure after many washings. It is not requisite that the chromate of potass should be crystallized, to take from it by these means the oxide of chrome. *M. Delasaigne* has succeeded equally well in producing as fine a colour, by calcining with the sulphur produced by the evaporation, given out by the solution of chromate of iron, heated with nitre, and which iron he had previously saturated with the weak sulphuric acid, to precipitate the silex and alumine which are often combined with that metal.[1]

The oxide of chrome is chiefly used in enamel painting. It may be employed in oil; and if this but seldom happens, it must be attributed to the high price of the colour, and also because it has not much brilliancy; yet it has more body than any other of the green colours; and this is sometimes an advantage.

GREEN EARTH.

This substance, which is found on *Monte Baldo*, in the vicinity of Verona, is an unctuous earth of a

[1] See *Annales de Physique et de Chimie*, tome xiv. p. 301.

pure green tint, which grows darker when mixed with oil. Klaproth, who analyzed it, found that it contained of

Silex, ...	53 parts.
Oxide of iron, . . .	28
Magnesia, ...	2
Potass, ...	10
Water, ...	6
	99

The green earth of Cyprus, which he has also analyzed, is composed of the same elements, differing little in their proportions. There are other green earths, called by the mineralogists chlorites, which differ from the latter in this respect,—that they contain alumine, but no potass. Green earth is often mixed with veins of brownish or redish ochre, which, of course, will affect the colours; but there are pieces found of one equal and bright tint; these, therefore, have the preference. Rubens has availed himself much of this colour, not in his landscapes only, but also in his carnation tints in his figures of a dead Christ. It is evident that much of the glazing is done with terre vert: it is, in fact, most useful in glazing; because, having only a thin substance, it can be rendered pale by a small portion of white, but in the end it becomes darker by the

concentration of its molecules. We see, in the greater part of Alexander Veronese's [1] works, some demi tints, which are too green, and which certainly were not so originally; it, therefore, must be used with great caution.[2]

CRYSTALLIZED VERDIGRIS, OR ACETATE OF COPPER.

This substance is combined of acetous acid and oxide of copper, to which the chemists have given the above appellation. It is prepared by dissolving verdigris [3] in distilled vinegar, evaporating it, and then crystallizing the solution.

The painters, who lived at the time when the

[1] As an instance, we refer to his picture of the Death of Cleopatra, in the Louvre.

[2] It should be ascertained beforehand, whether a mineral colour will, in time, become darker than when first laid on the picture. To ascertain the fact, it is only requisite to put a drop of oil upon one of these colours in their natural state; and if the tone this gives to it should be more intense than that which it acquires by being ground up, it may fairly be concluded that it will attain to the same degree of strength whenever, having completely dried, its molecules shall have re-united as closely as it is possible. Umber, terra siena, and terra verte, are of this class.

[3] The verdigris of commerce is a sub-acetate of copper, that is, a salt in which the oxide is in the largest proportion. It is prepared by exposing plates of copper to the action of the vapour exhaled from vinegar. At Montpelier and Grenoble were formerly the chief manufactories of this article.

arts were restored in Italy, used this colour; and Leonardo da Vinci, in his Treatise on Painting, chap. xcix., advises the application of varnish to the surface of that colour as soon as it is dry; because, being a soluble salt, it would be carried off whenever the picture was washed. This colour, when ground in oil varnish, is not soluble in water, but its only use is in glazing. The bright greens seen in some old pictures are made by glazings of verdigris. Yet it is probable that the ancients knew Scheele's green, the arseniate of copper.

SCHEELE'S GREEN.

The following process for making this colour has been published by its discoverer:—

Dissolve two pounds of sulphate of copper in eleven pints of pure (warm) water, in a copper vessel; then melt separately, also in warm water, two pounds of potass and eleven ounces of white arsenic pulverized; when dissolved, the liquid is to be filtered and changed into another vessel; the warm arsenical solution is then thrown upon the sulphate of copper, only adding a little at a time, stirring it constantly; when properly combined, the mixture is to be left quite still for some hours, and the colour is precipitated; the clear liquid is then

decanted; upon the residuum some pints of warm water are thrown; this is to be well stirred; it is allowed to settle, and is then decanted; having in this way washed the precipitate three or four times, it must be passed through a filter, and when sufficiently firm it is put into shape and dried upon unsized paper.

The above quantity should produce one pound six ounces of dry colour.

By this process, however, we are not certain of obtaining the same shade of colour; because the potass of commerce does not always contain the same quantity of alkali. In such a case there would be a waste of either sulphate of copper or of potass and arsenic.

To make the results more certain, and not to lose any of the materials, the acid of arsenic and the sulphate of copper must be combined. For that purpose the arsenic should be reduced to powder[1] and dissolved in a sufficient quantity of water; the solution is then to be mixed with a sufficient

[1] Arsenic being a very dangerous and active poison, the precaution should be used of grinding it in water, to avoid being exposed to the chances of respiring some of the finer particles of its dust.

quantity of the sulphate of copper, one part of arsenic to ten of sulphate; this will not make any precipitate; some carbonate of soda or of potass is then dissolved; a very small portion of the arsenicated copper is then to be put into a glass, and precipitated by one or other of the two alkalies; the result will show whether the shade of colour is that required; if it be too yellow (which it will be if the proportion of ten of arsenic to one hundred of sulphate be exceeded), a fresh solution of pure sulphate of copper is to be added; the operation may be carried on either in a cold or warm state; if the former, the colour will be more pale; if carried on to a high temperature, the precipitate will appear like sand, and it then crystallizes; if caustic alkali be used, the colour becomes very dark and dries hard; it sometimes happens that this colour is required to be of the greatest intensity.[1]

In place of soda or potass, the precipitate may be made with lime water; but it requires a very great quantity to precipitate completely the arsenicated solution, but the precipitate will be equally fine.

[1] Prepared by this method, Scheele's green has a glassy fracture, and is difficult to grind; but if it be soaked in water and afterwards allowed to dry gradually in the air, it will split into small pieces, and then it can be triturated much more readily.

VIENNA GREEN.

For many years past there has been a very brilliant green from copper, known in commerce by the name of Vienna, Brunswick, or Sweinfurth green.

M. Broconnot, having analyzed it, has succeeded in preparing it in the following manner:—

Six parts of sulphate of copper are to be dissolved in a small quantity of warm water; then boil six parts of the white oxide of arsenic, and one part of potass; mix this solution by slow degrees with the first, until the effervescence is quite gone off; it soon forms a yellow precipitate, rather dirty, greenish, and very abundant; three parts of acetous acid are then to be added, so as to allow a trifling excess discoverable by the smell; by slow degrees the volume of the precipitate diminishes, and in a few hours it spontaneously forms a deposit at the bottom of the liquor (which is quite discoloured) a powder of a fine green colour, and slightly crystalline; the floating liquor is then decanted, and the precipitate is carefully washed.

Dr. Liebig has published another process, here subjoined, which gives the same result.

Some distilled vinegar is to be put into a copper

saucepan, and, being heated, one part of verdigris is to be dissolved in it; to this is added a watery solution of one part of white oxide of arsenic; these form a precipitate of a dirty green tint, which, for the beauty of the colour, must be got rid of; for this purpose an additional quantity of vinegar must be added, until the precipitate is again dissolved; the mixture is then to be boiled; a new precipitate is formed in granular crystals of a beautiful green colour; the liquid is then drawn off, and the colour carefully washed.

If the floating liquor should still contain an excess of copper, some arsenic is to be added; if only arsenic, then acetate of copper; or if it contains an excess of acetous acid, this will serve to dissolve more verdigris.

Instead of dissolving verdigris in vinegar, crystallized verdigris will do as well, dissolved in water. The colour prepared in this way has a blueish shade: if it is required to be more yellow, the arsenic must be increased. It might also be desirable that it should be of a deeper hue: for this purpose a pound of potass must be dissolved in water; add to this ten pounds of the colour obtained as above, and heat the whole over a moderate fire. The colour will soon be observed to grow darker, and take the

required hue: if boiled too long, it comes near the tint of Scheele's green, but always is superior to it in beauty and brightness. The alkaline liquor which remains after the operation may be used in preparing Scheele's green.

BROWNS.

Asphaltum, or bitumen, is a species of pitch, or mineral oil become solid. Bitumen is collected on the surface of the lake Asphaltites, (the Dead Sea,) and is called "Jews' pitch;" but the greater part of the asphaltum of commerce is derived from liquid asphaltum, which is evaporated to dryness. The bitumen is of a fine black tint in its fracture, is easily pulverized, and its powder is brown. It is not ground—it is only melted, and a fine brown colour is thus obtained, of the greatest transparency; but it retards the drying of oils, and the drying quality must be increased as much as possible. There are two modes of preparing bitumen: a thick varnish is first made by dissolving it in oil of turpentine; this does not require much heat, and even, in time, will dissolve when cold. This varnish is so thick that it cannot be used without mixing it with the emplastic oil of Italy, or mastic varnish: this prevents its flowing off

the palette. This is the manner in which the English and the Italians prepare bitumen.

It may also be prepared in the following manner :—

Venice turpentine, . . .	15 grains.
Gum lac, ...	60
Asphaltum, ...	90
Drying oil, ...	240
White wax	30

The gum lac is first dissolved in the turpentine by adding fifteen grains at a time, and allowing it to melt before the other portion is added; the asphaltum is then to be mixed in like manner, by degrees; the linseed oil, having been heated near to the boiling point, is also by degrees mingled with the rest; the wax is then added. Before the mixture cools, it should be thrown upon the stone, and well worked with the muller and knife. Thus prepared, the bitumen will dry in one day equal to flake white ; but as a skin will form on the surface of the mass, this must be prevented by putting it into a tin cylindrical vessel, covered with a disk of the exact diameter of the interior. By pressing this disk, in which is a small hole, the bitumen oozes out, and then the hole is closed with a wooden peg, so as to prevent the air from coming in contact with the surface of the

liquid. In this way it may be preserved soft for a long time.[1]

A greater degree of solidity would be given to the bitumen if it were dissolved in amber varnish: sixty grains of this varnish should be substituted for turpentine. The gum lac will dissolve readily in the varnish.

BROWN OF PRUSSIAN BLUE.

M. Bouvier has published a process, by means of which Prussian blue may be converted into brown, or black, by intense heat. This brown has all the transparency of asphaltum, with this advantage, that it dries quickly, and is permanent.

M. Bouvier's process is, to place upon a clear fire a large iron spoon; when it is red hot, put into it some pieces of Prussian blue about the size of a small nut; these soon begin to crackle, and throw

[1] Some years ago, an Englishman proposed the employing of syringes made of tin, or of copper tinned, to preserve from injury certain colours,—such as the lakes and Prussian blue, which soon undergo an unfavourable change in the bladders. And the "London Society for the Encouragement of the Arts" rewarded the proposition with a silver medal and a purse of ten guineas. Yet it is not very probable that many English artists have adopted that expedient. See *The Journal of the Arts, Manufactures*, &c. No. 269, p. 280. Oct. 1824.

off scales in proportion as it grows hot; remove the spoon, and let it cool: if allowed to remain too long on the fire, the right colour will not be obtained: when the colour is crushed small, some of it will be found blackish, and the rest of a yellowish brown: this is quite as it should be.

M. Bouvier states that this pigment can only be obtained from the genuine Prussian blue in common use. He states, that he "never succeeded in making it with that sort which is manufactured in England." Thus it would appear, that to make the operation certainly succeed, blue must be employed in which there is much alumine. That of English manufacture, which is darker than ours (in France), consequently contains but little of this substance: when completely calcined, the English blue only produces a sort of orange colour, which is, in fact, very transparent and intense. Another condition requisite to the success of the operation is, that the heat ought to be at once carried to the exact point required. This is easily done by using proper caution. Instead of commencing the process by heating an iron spoon, the bits of colour may be placed on a plate of iron, and the plate laid upon a quick fire; they sometimes give out flame, and

always grow red along with the plate; when taken off the fire, they are left until they cease to emit smoke, and the blue colour has disappeared.

If the blue is calcined in a close crucible, a black is formed, which will be found very useful, as it dries well.

BROWN PINK.

This colour, as we have stated at page 143, is made by precipitating, with alum, a decoction of French berries *(rhamnus infectorius)* in such a way as that the alkali shall not be saturated. This colour would be more lasting, if, instead of the berries, yellow wood, quercitron, and holly bark, for instance, were used; and still better would be the husks of nuts,[1] which produce a very lasting brown colour.

Mixture may also be made, in whatever proportions are most agreeable, of woad, madder, and husks of nuts; and instead of using alum to precipitate the decoction, the acetate or sulphate of copper should be used, which, as we have already observed, is the best mordent for giving stability to the colours. Bones, or ivory half calcined, produce

[1] The husks of nuts contain some portion of starch: for this reason it would not be proper to employ boiling water for the purpose of extracting the colour.

very transparent browns, and are lasting, but are the worst driers possible.

UMBER.

Some mineralogists have confounded this earth with that of *nocera in umbria*, which is bituminous and inflammable, like those of Cassel and Cologne. It resists the action of fire like the ochres. It is brought from the Isle of Cyprus, and is known in commerce as Turkish or Levant umber. Its colour is an olive brown, which becomes much darker, and of a warmer tone, when it is calcined. It is principally composed of the oxide of manganese, oxide of iron, silex, and alumine. This colour has much body, and dries rapidly, especially after it has been calcined. It grows darker by time; but this is not a reason for setting it aside: this disadvantage may be obviated by mixing it with colours which grow paler by the action of light, such as the brown, pinks, &c.

Some painters have painted on grounds primed with umber,[1] but it has penetrated through the lighter parts of the work.

[1] There are several of Poussin's pictures painted on umber grounds. That fine series, "The Seven Sacraments," is clearly amongst the number.

CASSEL AND COLOGNE EARTHS.

These are bituminous earths, originating as it is supposed from the decomposition of wood; the mineralogists have also given them the name of lignites. The Cassel earth has the greater quantity of bitumen, and has a rich tone of colour, but it loses this in some measure by exposure to the light. I remember to have seen a head, the brown hair of which had been painted with a mixture of white, and this brown for the light; yet this part was darker than that part painted solely with it unmixed, the white having fixed the colour. Another serious inconvenience in the bituminous earths, is their retarding the drying of the oils; therefore when employed, they must be ground with the strongest drying oils; and to compensate for their growing lighter by the action of the air, they should be mixed with colours that are permanent, such as umber, charcoal black, and oxide of iron.

BLACK.

The blacks used in painting, are generally made from animal or vegetable carbon; but fossil black is also used.

Ivory black is also formed by calcining the parings

of that substance, left by the workmen's tools; it is very deep in tone, and transparent. Bone black, carefully prepared, differs little from the last; it is a little warmer in tone, and may be made quite brown, if the carbonizing is stopped ere it is completed; this brown is very transparent, but it must be ground in drying oil, or it will not dry.

Charcoal black has less intensity than ivory or bone, and is less transparent; and the tints it produces are rather blueish. It is prepared by calcining in a close vessel, the shells and husks of peaches, apricots, nuts, the cuttings of vines, and other young woods; there is not much difference in the tints of these various sorts; that which grinds the finest, is to be preferred. In this respect, the preference is due to the Liege charcoal, which is easily ground; whilst charcoal from peach stones, vines, and most sorts of wood, are on account of their elasticity, difficult to reduce to the tenuity of the other colours.

Liege black is prepared by calcining it in a close crucible, and then washing it in boiling water, to carry off the soluble salts which it contains.

In a similar way is prepared the coffee black, from the husks of coffee; its properties are similar to the last, it is strongly recommended by M. Bouvier in his "*Manuel de Peinture.*"

It has been said that black of smoke, or lamp black, produces injurious effects in oil. I have not experienced it, but I am certain that this black, when well calcined and washed, may be employed without danger, yet we should be aware that all the blacks from smoke do not produce the same effect, for they differ very much in quality; lamp black is the most intense, and the lightest; that from coal smoke is much heavier and coarser; it contains a large quantity of ammonia.

Smoke, or lamp black, is the basis of Indian ink, and though it belongs exclusively to water colours, yet perhaps it would be acceptable, if I should describe a method of preparing it of a very good quality.

INDIAN INK.

The best of this manufacture, has a shining black fracture; its body is finely compact, and homogeneous when rubbed with water; there is not the least appearance of particles, and when diluted in much water, there is not any precipitate formed; when dry, its surface is covered with a pellicle of a metallic appearance; when dry on the paper, it will not yield to the action of water, yet it will give

way at once to that action, when it has been used and dried on marble or ivory, which proves that the alummed paper forms a strong combination with the ink.

Nothing is positively known of the method of preparing it, except what Duhalde has told us in his "*History of China.*[1]" The receipt which he

[1] M. Julien, assistant librarian at the Institute of France, has, with much diligence and care, examined the Chinese Encyclopediæ, yet he has not been able to discover any receipt given in so much detail as that published by Father Duhalde. He has, however, found several useful papers, which, I think, ought to be made known.

From these documents we learn, that the ink of Nan-King is the most esteemed; and amongst the different sorts imported into this country, we find those of the finest quality are made with lamp black of the oil of Sesame; with which are combined camphor and the juice of a plant called *Houng hoa (hibiscus rosa sinensis)*, to give it brightness of tone.

This lamp black is obtained by means of one hundred lamps, over which a large plate of thin iron is suspended, to collect the smoke, and prevent its dispersion. From this plate the smoke is removed by sweeping it with a feather brush.

In another *Encyclopædia*, entitled "Thian-hung-haïvè," Vol. iii. p. 44, we find that one-tenth part of the ink manufactured in China is made with lamp black, prepared with oil of the *Toung tree*, pure oil, or the fat of pork. The remainder is made with lamp black from the red pine or the fir deal.

One active careful person can collect the black from two hundred lamps; but if it be collected slowly, it becomes burnt.

The common ink is made with black prepared in the following manner:—

After having extracted the resinous matter from the pine or

has given, as taken from a chinese book, is as follows:—

The makers of this ink take some of the plants hohiang and kansang, the cloves of tchu-yia-tsao-ko, and the juice of ginger; these are to be boiled in water, the decoction clarified, and then evaporated to a thick consistency: ten ounces of

deal trees, there remains only the lighter parts. The ink made with the lamp black of this wood loads the pencil, does not flow readily on paper, nor is it perfectly soluble.

When it is intended to extract the resinous sap from the pine, a hole is dug at the foot of the tree; an incision is then made in the stem; near to this a lamp is placed; the wood grows warm by degrees; and in a short time all the juice of the tree flows out through the incision.

The pieces of pine to be burned for lamp black ought to be small, and about half a yard in length; the apparatus for collecting the soot is a long cage made of trellised bamboo, similar to the roof or awning put up by the sailors as a shelter from the sun; it should be sixty cubits in length (thirty yards), both the interior and exterior are covered with large paper; when it is prepared they set up several partitions, leaving an opening for the passage of the smoke; the floor is laid with earth and bricks; the fire is allowed to burn for several days, and when a certain quantity of the wood has been consumed, they go into the bamboo cabin to collect the soot.

As soon as the fire is lighted, the smoke soon penetrates from the first partition to the last; the smoke which fixes on the ceilings of the two most remote divisions gives the lightest and softest black; that of the centre chamber is heavier and inferior in quality,—it is used in making common ink; whilst that which forms in the first and second from the entrance is too coarse for ink-making,—it is sold to printers, varnishers, and house-painters.

this electuary is then mixed with four ounces of size, made from asses' skin parchment; this mixture is then incorporated with ten ounces of smoke black, and then the whole is wrought into a fine paste, which is put into moulds; these are covered up in the ashes, where they remain a longer or shorter time according to the season.

P. Duhalde, being aware that all the plants mentioned in this process, except the ginger, are unknown to our botanists, saw at once that his receipt would be useless, unless he could give some means of substituting, for the Chinese plants, those of our own country which are most analogous to them. He therefore, on this subject, made diligent inquiries, the result of which he has published; we learn from the author, that the pods called *tchu-yia-tsao-ko* are produced by a bush or shrub, and resemble those of the caroub bean, except that they are smaller, and nearly round. The Chinese plants inclose cells filled with a pulpy substance, of a pungent and unpleasant flavour.

Ho hiang is, according to the Chinese dictionary, an aromatic medicinal plant, to which are attributed the same qualities, as belong to the *sou ho*; another plant from which is extracted a balm similar to liquid storax.

Finally, the Kan-sung is a plant used in the composition of perfumes, and is pleasing to the taste.

The processes used in the arts, are always difficult to describe; yet, even though we should be in possession of the plants employed by the Chinese, it may be doubted whether we should quite succeed in imitating their ink on the first attempt.

The pods which resemble the caroub, appear to me to belong to the mimosa.[1] The harshness of their scent is a sufficient indication that they contain much of the astringent principle: how is it, then, that their decoction does not precipitate gelatine? have not these vegetable juices need of a new clarifying process?

P. Duhalde speaks of the alkaline properties of the ink; how then shall we reconcile that with the gallic acid, contained in juices of the astringent plants? There must therefore be some omission, for the alkaline principle could not exist, or at least no one has yet, by any known means, been able to saturate the acid contained in the vege-

[1] This, probably, is the *mimosa indica;* the pods of which are used in the process of dyeing, and have been for some years imported into Europe. In France they are known under the name of *babla;* their decoction gives only one precipitation, not very abundant in the solution of gelatine.

table decoction; and, it may be added, that this Chinese ink may be dissolved in vinegar, without forming any precipitate.

However imperfect this description may be, it nevertheless points out the way to us, by informing us that the Chinese do not use any pure size in the manufacture of their ink, but that they add some vegetable juices, which give the ink greater brilliancy, and fix it more firmly on paper.

In fact, if fine lamp black be intimately combined with pure gelatine, it produces an ink of a fine black tint; but in its fracture it will not be glossy, neither will it be indelible on paper, like the good Chinese ink, with the disadvantage of being affected by the frost in winter.

Here then we have obtained two important points: namely, that it is indispensable, that the ink shall be fluid in winter as well as summer; and also that it shall resist being washed off the paper. The first of these qualities can be easily obtained. For the purpose of making such an alteration in the gelatine, as will ensure its fluidity to equal that of gum; it only requires that the ebullition should be carried on to an elevated temperature; but as the caloric would in this action form an ammoniacal soap, which attracts the moisture of the atmo-

sphere; it would be preferable to employ a process, by which the starch or gelatine may be changed into a gummy and saccharine substance. This method consists in boiling this starchy matter in water, acidulated by sulphuric acid, and afterwards saturating the acid with chalk.

To render the ink insoluble on paper, it is requisite to mix with the animal size some juices of astringent vegetables, so carefully combined, as not to occasion any precipitate.

The infusion of nut galls into a solution of gelatine, will cause an abundant precipitation, which will unite in a resinous, elastic, and brilliant mass. This compound, which is insoluble in water, can be dissolved by ammonia (hartshorn), and in a greater quantity of gelatine. The ammoniacal solution of this precipitate is very brown, but transparent; and when dry it will not dissolve in water.

The resinous matter dissolved in gelatine, is still soluble in water after it has been dried, but it dissolves much slower than pure gelatine. It is therefore to the action of the tannin principle on the animal gluten, that we must ascribe the fixedness of Indian ink upon paper.

The size prepared from parchment made of asses' skin is considered the best, though it is not evident at first sight on what account it should have the preference so decidedly; and I must state, that having tried, by way of experiment, to convert asses' skin into size, by passing it through lime, I have only at last succeeded in dissolving it, by steeping it for several days in lime water.

The Chinese attribute to this animal gluten some peculiar medicinal qualities, and it may be that this idea influences them in preparing it with particular care. I have seen some of this size which was very transparent, but I have not been able to procure a portion, to compare it with that made from offal of oxen, &c.

The best size is that sort, which, when steeped in water, only swells without dissolving; this species is very rarely found for sale, but in place of it, the Flanders size is the next best.

After having steeped this substance for several hours in water, about three times its weight, which has been acidulated by a tenth part of sulphuric acid; that part of the water is to be drawn off which contains the portion of size which is too soluble, and this must be replaced by an equal quantity of water,

slightly acidulated. The size is then to be boiled for an hour or two, and the ebullition brings it to such a condition, that it will not when cold return to a state of jelly.

The acid should then be saturated with powdered chalk, with which it is combined by a little at a time, until the resistance of paper shows that the saturation is sufficient. The mixture is then filtered through paper, and it passes quite transparent.

About one quarter of this size is then to be taken away, and upon it should be thrown a solution of the concentrated essence of nut galls; the gelatine then precipitates, and becomes the elastic resin-like substance already mentioned; this matter is then to be washed in warm water, and dissolved in clarified size; it is again filtered, and it is allowed to draw near to the proper state, for the purpose of incorporating it with the lamp black, that too much time may not be lost, in waiting until the paste has acquired the proper consistence requisite for its being moulded.

The astringent principle contained in vegetable juices, will not form a gelatine precipitate, when the acid contained in it has been saturated. Nut galls, or any other vegetable containing much of the astringent principle, may then be boiled with

magnesia, or lime[1]; and then mixed with the filtered decoction of the size, there will not be any precipitation; and the size thus prepared will be so much less soluble when dry, in proportion to the quantity it may contain of the astringent matter.

It is only by cautiously proceeding, that we can ascertain the most just proportion of the astringent matter, which ought to be combined with the size.

By whatever mode the excipient is prepared, for being mixed with the black pigment, it must be equally well clarified, by washing it in plenty of water, until it leaves no sediment; whenever this takes place, there is nothing more required, than to concentrate its substance to the proper degree of consistency, by evaporation.

It is also by proceeding cautiously, that we can ascertain the relative proportions of black and size, since that size may be more or less strong: but we shall succeed in this object without difficulty, by making the two following trials :—

With a pencil, apply a light wash of ink upon a slab of porcelain, and with a pen put some

[1] I believe this ink would be very good; but it has not that property of the China ink, of dissolving in vinegar.

writing on paper; if the ink on the porcelain shines, this is a proof that it has sufficient size in it; and if, after it is dry on the paper, it cannot be washed off by water, it is clear that there is not too much size in the composition.

The Chinese use wooden moulds to form their ink paste, but these moulds may be made very well of potter's clay, baked; and when they have not been half vitrified by the fire, they will adhere to the tongue. In this state they absorb a portion of the moisture in the paste, and this facilitates the discharge of the moulded ink, in a short time after having been compressed in the mould; the sticks of ink are afterwards covered up in the ashes, to prevent their becoming split in the drying; and the moulds may be dried in the sun, or on a stove; and if the pores of the latter, after a long service, should cease to absorb the humidity, they should be boiled in a wash of caustic lye, and then dried as usual, or exposed to a red heat.

The quality of the lamp black has a great influence upon the quality of the ink[1]. We have seen in a note at the beginning of this article, that

[1] The pellicle skin of metallic appearance which forms on the surface of Indian ink, when drying, is chiefly owing to the lamp black in its composition.

the black of which the "Imperial Ink" is made, consists of extremely light lamp-black; in the preparation of which great care is taken. For this purpose, a metal stove may be employed; into this stove, a lamp with many burners must be placed, and surmounted with a large plate of iron; the opening of the stove should be so arranged, as to allow the combustion of the lamp to produce as much smoke as possible: and for this purpose, various oils and fatty substances are tried, to ascertain which will best suit this purpose.

In China, the finest lamp black is prepared from the oil of *girgelin*, which we are assured is the oil of sesame.

M. Proust, in the analysis which he made of some Chinese ink of the finest quality, found two per cent. of camphor in it. This substance is also pointed out in a receipt, to be found in the Chinese Encyclopediæ. From this information, I mixed a little camphor in the ink which I made, and I soon found the good of this addition. When the ink in which it was mixed, was in a state of paste strong enough to be moulded, I have pressed it with the fingers slightly touched with oil, and it did not adhere in the slightest degree; in this state, it took perfectly the impression of the seal,

and this facility of moulding, I attribute entirely to the camphor.

WHITE LEAD.

The only white now used in oil painting, is a combination of prot-oxide of lead and carbonic acid; it is called in chemistry "the sub-carbonate of lead." From the various modes of preparing it, arises a very great diversity in the qualities; these are known by the names of ceruse, flake white, krems white, and silver white.

The ceruse made in Holland has long had the reputation of being the best in that class of whites. It is not a very clear white, and is therefore used chiefly in house painting, and in priming cloths for pictures: it is often mixed with chalk. The German ceruse contains a large proportion of the sulphate of barytes, but the Dutch ceruse of the first quality is pure.[1]

Flake white is brighter than ceruse; it would even equal that of krems, if proper care was employed in its fabrication. It has the great advantage of not being liable to adulteration: it is called by the colourmen "common white."

[1] These ceruses also contain acetate of lead, metallic lead, and ammonia.

These two species of white are prepared by exposing plates of lead to the action of vinegar steam and carbonic acid. For this purpose, earthen vessels, either glazed or hard baked, are employed; slips of wood are laid across these, and the lead in plates, or spiral forms, is placed upon them, so as not to touch the liquid which fills the bottoms of the vessels. These pots are then ranged in lines, close together, upon a bed of stable dung. Other lead being placed as tiles upon those pots, some planks are laid over them; on these are placed another layer of dung, and on this another range of pots is placed, covered with lead in like manner; and thus it proceeds until the pile is six or eight feet high, as the localities may permit. To prevent the heat from becoming too powerful, openings are reserved in the layers, at proper distances, through the mass. These are usually closed, but opened occasionally to examine the temperature: when that is too high, a current of air is allowed to pass through, until the heat is brought down to the standard required, which should not exceed thirty-five or forty degrees at the most, unless it may be towards the close of the operation, when it is only required to dry the carbonate which has been formed.

In about six weeks the pots are removed, and the laminé which cover them have become hard flakes, which, without further preparation, is the flake white of commerce. The spirals are unrolled, and flakes of a smaller and more brittle nature are drawn from them. These are ground in water, under horizontal grinders; the produce is then washed, and allowed to settle; the water is drained off, until the deposit has acquired a thick consistency; it is then put into conical pots, and dried for use.

This is the way in which the Hollanders prepare their ceruse. Its want of brightness arises from a small portion of the metal not being thoroughly oxidized, and also from the use of litter, which throws out vapours, by which the oxide is darkened as it is formed. This disadvantage may be obviated by using moistened straw, or common tan, for the couches: the flakes will then have a brilliant whiteness[1].

The following experiment, made in my presence, several years since, will show how the operations are conducted in Holland. It proves, that vinegar, of itself, will not convert the lead into carbonate, and that the carbonic acid must be combined with it.

[1] To facilitate the fermentation of the straw, it must be wetted with warm water.

A vessel of common vinegar is placed under a glass bell; plates of lead are then laid over the vinegar, in such a way as to allow the vapour of the vinegar to have free access to every part of its surface; the bell is then carefully luted to the surface on which it stands.

A similar apparatus was then prepared, but to the vinegar were added some bits of calcareous marble, which, in decomposing, produced carbonic acid gas. The two bells were thus exposed to the same temperature of thirty or thirty-five degrees for a month: at the end of that time, the leaden plates inclosed under the glass with the pure vinegar were covered with a crystalline and transparent couch of acetate of lead, without a particle of the carbonate; whilst, under the other glass, the plates were found covered with a couch of various thickness; the upper plates, placed horizontally, were more than half converted into carbonate of lead: it was soft, because the moisture could not evaporate. There is no doubt, that if it had dried in this state, it would have formed compact flakes, such as are sold in the shops. We collected the whole upon paper, and it did not yield in brightness to the finest krems white.

Thus it would appear, that in the operation just

described the carbonic acid is furnished by the stable litter.

The carbonate, when just formed, is soft; and it is, no doubt, to dry it completely, that the pots are left so long in the dung-heap.

KREMS WHITE.

The addition of a substance to furnish carbonic acid is quite requisite in this preparation; but the heat of a stove is substituted for that of stable dung. The leaden plates are exposed in this process to the united vapours of vinegar and carbonic acid gas in deal boxes, the bottoms of which are made secure from leakage by varnish, or some resinous liquid. The leaves of lead are about the thickness of a line,[1] are arranged, in the form of chevrons, upon lath, supported by a stronger piece of wood placed across the interior of the box. The leaves are isolated from each other, and distant from the surface of the vinegar about three inches.

To produce the carbonic acid, the union of which is requisite in making white lead, a certain proportion of the lees of wine, or tartaric acid, is added to the vinegar. The same effect may be produced by marble, as already stated.

[1] One-twelfth of an inch.

The boxes are then closed, and placed upon a square tube containing warm air. This is carried around the workshop, and brings the temperature up to thirty degrees, but must not go beyond this point, otherwise the vinegar would evaporate too rapidly, and much of it would be lost.

In about fifteen days the boxes may be opened, and if the process has been well conducted, a quantity of carbonate should be collected equal to the quantity of metal employed.[1]

But as the white lead obtained by this operation has not the hardness of that obtained by the Dutch method, it need not be ground, and is made extremely fine by a very simple apparatus. This is composed of a large box, divided into nine compartments, decreasing in depth; the flakes are put into the highest division, being separated from the metal that has not been attacked; water is then turned on from a reservoir placed above the case, and the mass is well stirred with a stick. The water soon flows over, and runs into the second division, then into the third, and so on to the ninth.

It is supposed that the particles of white drawn off by the water are finer in proportion to the dis-

[1] The carbonate of lead contains very nearly 16 per cent. of carbonic acid.

tance they have been carried; therefore the deposits in the lowest divisions are of the best quality. The divisions are then emptied of their contents into large vats; the white subsides in a little time, and, when drained of its liquid, is put into porous earthen vases, the square shape of which it retains when dry. This drying takes place in the same stove where the metal was converted into white lead.

Krems white is the brightest white that is used in oil: it has rather less body than flake white, because the particles are much finer: an equal weight of krems will cover a much greater space than flake white. When newly prepared, it gives out a strong smell of vinegar.

The Society for Encouraging National Industry, (in France,) on its formation, offered a prize for the most complete mode of making the ceruses. The conditions were, that it should be economic, and that it should produce a white equal to the best white of commerce.

After eight years of experiments, the prize was gained by MM. Brechoz and Le Sueur, who were then established at Pontoise. The samples they produced were equal to the finest krems white, and the commissioners charged with their examination

were of opinion that it was prepared in a similar manner. The result has proved that they were correct in this opinion, as *MM. Cadet de Gassicourt* and *Marcel de Serres* have communicated the following process, which is used in the Austrian factories.[1]

The process thus discovered by the aid of the Society, has been much improved in a large establishment formed at Clichy.

The mode of making the white is quite different in this process from what it is in the methods just described. The ceruse is prepared very quickly, by forming a precipitate, with carbonic gas, in a supersaturated solution of prot-oxide of lead. This solution is prepared by agitating, in a cold state, litharge and distilled vinegar; when this mixture is sufficiently concentrated, it is passed through a current of carbonic acid gas, which unites with the greater portion of the dissolved oxide of lead; the precipitate is collected, washed carefully, and then dried for use. The liquor floating on the top is vinegar, still holding in solution some prot-oxide of lead, which, being charged with more litharge, gives a similar precipitate, having lost nothing of its

[1] See the bulletin *De la Societé d'Encouragement* (eighth year).

power. The carbonic acid employed is drawn from ignited coals, and, ere it is used in the solution, it is washed in a large quantity of water, by which means it deposits completely a quantity of ashes and oily hydrogen gas along with it, which would blacken the ceruse. The ingenious apparatus contrived to produce the precipitate are the sole property of the inventors, who only have a right to make them public. Besides, it would be very difficult to give a clear notion of this machinery without going at a great length into detail; but as artists may happen to be in places where it would be impossible to procure fine white lead, perhaps it would be useful to offer a mode by which, in a few days, they may produce a quantity sufficient for their purposes,—supposing always that they will have at their command, vinegar, and litharge, or even lead.

The operator must, in the first place, distil the vinegar; afterwards supersaturate it with oxide of lead, by combining it with litharge: if the litharge be bad, or contains copper,[1] it will then be better to convert the lead into massicot, which is easily done by calcining it in an iron vessel. The saturation should

[1] But the copper, not being precipitated by the carbonic acid, will remain in the solution; from which it may be precipitated in its metallic state by means of iron.

be made in a little barrel of white wood, with an axis through its centre; to this a handle is fixed. By turning this apparatus for a short time, a supersaturated solution is obtained; this is decanted, and, when cleared by rest, it is put into a deep vase.

To form the precipitate caused by the combination of the carbonic acid, this acid is to be disengaged from the chalk by sulphuric acid.

For this purpose some chalk must be prepared by washing, and a deep vessel about quarter filled with it; this should have two tubes, but if these may not be had, a vessel may be used with a wide neck, large enough to admit a large cork pierced with two holes; into one of these the beak of a tunnel is introduced; to the other is adapted a crooked tube of glass, the other extremity is to be plunged to the bottom of a flagon containing full three parts of water; this flagon is closed, like the first, with a large bung, pierced with two holes; through one of these the tube passes; another curved tube is fixed to the other aperture, and descends to the bottom of the vessel containing the solution; this is called "Waulf's apparatus;" the intermediate flagon of water is intended to wash the gas, and to disengage it from

any sulphuric acid which it may contain; the tubes and the tunnel should be so closely luted, that the gas may not escape but by the tubes; flour paste and paper will be sufficient luting.

The apparatus being thus prepared, some sulphuric acid is then passed through the tunnel; the acid must be mixed with ten or twelve times its weight of water; and when the gas begins to escape by the mouth of the tunnel, this must be closed by a sort of piston, formed by folding linen or cotton round a glass or wooden cylinder; the tunnel may then be filled with weak acid, and easing the piston occasionally, some of it may be let fall, and the tunnel again closed; the gas soon disengages itself, passes across the water of the flagon, whence it becomes purified, thence it enters the vase containing the saturated acetate of lead, and forms a fine white precipitate, which is the carbonate of lead; the liquor is then shaken to accelerate the combination, and this is continued until the carbonic acid ceases to form any more precipitate; it is left to settle, the floating liquid is poured off; this is vinegar still holding in solution a great quantity of oxide of lead, which may again be saturated, and a new precipitate obtained; the precipitate is to be washed in a large quantity of water,

and allowed to make a deposit; this is collected and dried for use. All this may be properly done in eight days.

White lead is used only in oil painting, and even then it becomes blackish; and would at length return to the colour of its dull metallic state, if it were not preserved by a couch of varnish from the action of hydro-sulphureous vapours, which float constantly, more or less, in the atmosphere.

White lead should, therefore, never be used in distemper painting. There is a signal instance of that kind of alteration of which I have just spoken, in the ancient collections of design retouched with white, in the lights; these parts have become black in those drawings where lead has been used. Luckily M. Thenard has found out a method of restoring them to their original whiteness, though darkened by contact with hydro-sulphureous vapours. That eminent chemist was consulted some years ago upon the means of restoring to their original whiteness the black spots which had formed upon a valuable drawing, by the changing of the white lead. He had just terminated his experiments upon the oxygenated water, of which he was the discoverer. Among the various uses of that water, he had ascertained its power of instantly converting the

sulphuret of lead into sulphate of lead, which is white. He soon applied it practically; and touched upon the black spots of the drawing with a pencil dipped in weakly oxygenated water,[1] and immediately restored it to its primitive state, without in the least altering the brownish tint of the paper.[2]

[1] Water, which in its natural state contains a volume of oxygen equal to itself in bulk, may be made to contain as much more,—that is, two volumes of oxygen to one of water.

[2] See the *Annales de Chimie et de Physique*, vol. xiv. page 221.

CHAPTER V.

ON THE PREPARATION AND GROUNDS OF PANELS, CANVASSES AND WALLS.

From the time that the restoration of the arts in Italy commenced, down to the days of Raffael, panels were always used for painting on, except when the works were to be fixed to a particular place. Canvasses united the advantages of cheapness and easy removal. The latter, therefore, gained a preference; and after Raffael's time they no longer painted large pictures on wood in Italy.

In the Low Countries the use of panels continued much longer. Even in the time of Rubens there was, at Antwerp, a celebrated manufactory, where the panels were prepared of great dimensions; but after the death of the chief artist of the Flemish

school, the artists painted only easel pictures on wood.

The Italians preferred poplar wood for this purpose. In Flanders oak was used; as it is very seldom injured by worms.

It is natural to suppose, that panels composed of several pieces glued together, might become disunited, by the changes arising from dryness or moisture, to which pictures are always more or less subject. To prevent these accidents, very great care was taken in the earlier times, but latterly these precautions were neglected; bands of linen were glued upon the joining, and even occasionally they covered the entire surface of the panel with black tanned leather; the glueing on of linen bands, is attributed by *Vasari* to *Margheritone*, who lived in the twelfth century, but it was known before his time, for the practice is described in Theophilus' treatise, *De arte Pingendi;* it was probably brought into Italy by the Greeks.

Theophilus informs us, that the planks or boards of which the panels were composed, were prepared by a tool used by vat makers, probably the rabet plane; these planks were then cemented at their edges, by a glue made from cheese, the manner of making which he describes; and he assures us,

that thus united, neither moisture nor dryness could separate the joints. This remarkable fact has been verified by experience, which clearly shows the superiority of this method of glueing,[1] and may be useful to artists. It is done in the following manner:—

Take some fresh cheese made with rich creamy milk,[2] triturate and wash it in warm water, until all the soluble part is carried off by the water; this may be operated in a sieve or a linen cloth, through which the cheese is afterwards pressed to get rid of the water; when quite drained, it crumbles like stale bread; it is then dried upon

[1] To prove the fact, some prepared boards have been exposed to the alternations of rain and sunshine for some weeks; one portion was jointed with the ordinary glue, and the other with the glue of cheese. The first-mentioned gave way in the joints after the rain and sun had acted upon them; but the latter remained quite firm and undisturbed.

[2] Here follows the original text of Theophilus:—

"Caseus mollis de vacca minutatim incidatur et aqua calida in mortariolo cum pilâ tamdiu lavetur, donec aqua multoties infusa pura indè exeat. Deinde idem caseus attenuatus manu mittatur in frigidam aquam donec indurescat. Post hoc teratur minutissimè super ligneam tabulam æqualem cum altero ligno, sicque rursùm mittatur in mortariolum, et cum pilâ diligenter tundatur additâ aqua cum vivâ calce mixtâ donec sic spissum factum sit ut sunt feces.

"Hoc glutinæ tabulæ compaginatæ, postquàm siccantur; ita sibi inhærunt, ut nec humore nec calore disjungi possint.

unsized paper, and in that state will keep fresh a very long time.

This material, which is *causeum*[1] mixed with a small proportion of butter, is not soluble in water, except by the addition of quick-lime; but by triturating this mixture, it becomes transformed into a very viscous sort of cream, which can be diluted with water to the consistency required for the work. It dries quickly, and when quite dry it cannot again be dissolved; therefore, no more should be prepared than can be immediately used. This is probably the cause why the use of it has been abandoned; but at all times a solid advantage is worth the trouble and difficulties of its preparation and use; besides, those difficulties would be greatly diminished by keeping, in a well-closed vessel, some powdered quick-lime to mix with the *causeum* at the moment of trituration: a little use of the muller will be sufficient for that purpose. It would be still better to soften the *causeum* in warm water, and for expedition' sake, the two substances should be kept in a close vessel, being previously mixed dry in the

[1] In England (says M. Merimée) there is an article sold under the name of "Vancouver's cement." It is a whitish powder made up in small parcels. This cement is nothing more than fine lime and causeum, or else the white of egg dried and finely pulverized.

right proportion, and reduced to a fine powder; this will give great facility to the trituration.

The panels were anciently primed with chalk, dissolved in animal size; it is the same preparation which is still used by the wood gilders in preparing their frames and other work. Plaister ground is preferable to chalk, and the term *ingessare* "to cover with plaister," is used by the Italian authors, to describe the application of distemper grounds to panels.

I have had occasion to analyse a portion of the ground of a picture by Titian, painted on wood; this ground was composed of plaister of Paris, with starch, and paste, but no glue or size, flour paste being used instead of gelatine. There has also lately a curious fact been discovered, namely, that a couch of distemper, which covered the envelope of a mummy, was composed of plaister mixed with animal glue.

In the commencement of the art the canvasses were prepared like the panels with distemper grounds; and it has already been stated, that generally the pictures of Paul Veronese were painted upon such primed cloths.

The practice now is, to prime the cloth with oil colour, changing the mode according as the canvass is of a closer or more open texture. When the

canvass is very open, and lets the colour through, it must be saturated with size made of glove parings, laid on with a large palette knife or trowel, the edge of which should be blunt, and as straight as a rule, that the couch of size may be laid as evenly as possible; when the priming is quite dry, it must be rubbed with pumice stone, to make it free from lumps; then with the knife, a couch of ceruse is applied; when dry this is also pumiced; a second couch is then put on, and sometimes a third, to obtain a perfectly even surface.

Formerly, the first priming was made with dark red, mixed with umber, or with pure umber; and some sixty years since, it was supposed that the drying of this colour would be quickened by mixing it with litharge; but it has been discovered that pictures painted on these sorts of preparations, in a few years have their surfaces covered with a multitude of little grains like sand; and thus proving that the litharge was badly prepared.[1]

At the present day, the artists are more careful in such essential matters; and the colourmen,

[1] Had the litharge been very finely ground, that evil effect could not have occurred.

for their own sakes, are excited to prepare their canvasses with more attention, for any negligence in these essential matters would ruin their trade.

Cloth for priming without sizing, ought to be of a closer and more even texture; in this respect ticking is peculiarly advantageous; for though at present it is not to be had of a much greater width than two yards; yet if the manufacturers found a demand for it, they, no doubt, would make it up to any reasonable dimensions. If the cloth is not sized, it will require three or four couches of colour to ensure an even surface; and before a new couch is applied, time must be allowed, for the former to dry hard enough to be rubbed with pumice; this is the reason why cloth requires, in preparation, two or three months in summer, and five or six in the winter season.

The time required for priming, may be shortened very much, by making the first and second couches with distemper; and as soon as they are quite dry, and pumiced into an even surface, let the last couch be merely oil, which has become viscous by exposure to the air; this will penetrate the distemper, and render it quite pliant. By the former method, much time is required to dry the cloth.

But by this mode, as soon as the oil is absorbed, they may be rolled up like waxed cloths, with perfect safety.[1] As the pliancy of these cloths depends upon the complete union of the oil with the distemper, the absorption would be greatly facilitated by using a very weak size, mixed with a little oil, and a good quantity of mucilage of linseed meal, or the latter mucilage alone will do if well boiled.

This species of ground may be made in four or five days, which will economise the time considerably. It is even pretended that a picture may be commenced immediately upon one of these grounds when fresh prepared, and that the colours will change much less than they do when used on a well dried ground; but such is not my opinion: for the viscous oil used in the ground, and to which the cloth owes its pliancy, dries but slowly. Hence the colours, being left too long exposed to the chemical action of the oil, are likely to undergo a change. I would therefore advise, that if circumstances compel artists to paint on such a ground when fresh, they would do well to apply a strong couch

[1] M. Rey is the first of our colourmen who has adopted this method. He gave to his primed cloths the name of absorbent canvasses; and they have preserved their pliancy for several years. See *Le Bulletin de la Societé d'Encouragement*, (fifth year).

of white chalk with a little size in it, to absorb the excess of oil; but it would, in such a case, be still better to paint on a distemper ground.

PREPARING A GROUND ON TAFFETY.

When pictures on this substance are to be placed under glass, its surface must be prepared as waxed cloth. For this purpose, some fine ceruse must be ground in fat oil, with which a little pure wax should be incorporated. Two couches of this mixture will be a sufficient preparation; and the taffety will preserve its pliancy for many years.

Painting on copper has been given up for some years. The preparation of it is not difficult; it must be finely pumiced to make the priming adhere to the surface; and to make it more permanent, it should be covered with copal varnish.

PREPARING GROUNDS ON WALLS.

Walls are rarely built with stone of a texture fine enough to admit of being painted upon. This is the chief reason why the cupolas and other parts of buildings must be covered with a couch of plaister, or cement, to prepare them for paintings in fresco. When the ceiling is perfectly dry, several primings of boiling linseed oil are to be laid on in succession;

after these a course of ceruse, or other colour suitable to the purpose, completes the ground; the usual coating is quick lime and sand, or brick dust; it is as durable as stone, if well prepared, but if the workmen are not careful, the best materials will produce but indifferent mortar, an oily cement would, of course, be preferable; this can be made by quick lime and fat linseed oil, ceruse, and sand; it is of no importance what the cement may be for mosaic, which is composed of powdered marble, quick lime, and linseed oil; the oil and lime form a paste extremely glutinous, and which flows too freely, unless the oil is very viscous, and then the cement will be sufficiently firm and manageable, but however freely it may flow about, yet in a few days it will become quite fixed; and it is all the better for having been mixed for some time.

Instead of boiling oil, for saturating the mortar, I should prefer using a mixture of drying oil and wax, such as was employed in the cupola of St. Genevieve.

Having heated the wall by a heater armed with a reflector, the composition should then be applied warm, and to make it penetrate deeper the heat must be kept up, until the ground ceases to absorb the oil.

With this preparation there is no danger of the colours being absorbed, or of being injured by humidity; and it is equally good for the plaister, as it prevents the formation of saltpetre.[1]

AN EXPEDITIOUS METHOD OF DEAD COLOURING UPON GROUND PREPARED IN DISTEMPER.

I shall now give a detailed account of the rapid mode of laying in a picture on distemper grounds, as it was practised by P. Veronese, and by other eminent painters previous to his time. At that era, when the artists began to leave distemper, for oil painting, this mixed process may be considered as the passage from the old to the new state of pictorial art. The cloth or panel being properly prepared for distemper painting, the dead colour is to be laid on with water colour and a little size; to which may be added a small portion of oil, or the emulsion of nuts, or poppy seeds; neither white nor opaque colours should now be used; it is better to employ water colours only; alterations in the design can be

[1] MM. D'Arcet and Thenard, who directed the works in the cupola of St. Genevieve, have composed the couch (laid over the plaister) with one part of wax and three parts of boiled oil, with one-tenth of its weight of litharge. See the Memoir on the Employment of Oily Substances, published in the *Annales de Chimie et de Physique*, Vol. xxxii. page 24.

made with a wet sponge, but the ground must not be disturbed; therefore, to prevent this, the ground should be mixed with a size which, when dry, could not be disturbed; *causeum* should, therefore, be employed in preference, mixed with a very small portion of oil or oily emulsion, that the ground may the more readily absorb the oil.[1]

Those who have painted in distemper well know how freely this species of colour flows in the pencil; the laying in of the subject is, therefore, completed with more facility than it can possibly be in oil; and it is equally manageable in making corrections, in careful execution, and management; and it is easy to make any alterations that may be thought requisite.

Should oil colours be afterwards used in the finishing, the oil will be immediately absorbed, so that it will be difficult to extend the colours. To prevent this inconvenience, a couch of white drying oil should be passed over the work; this, of course, will soon be absorbed, but it will be sufficient to prevent a new absorption, and the colours will then flow freely.

[1] Prepared plaister of Paris does not allow of being finely tempered with water; therefore, in such cases it would be better to brush over the back of the canvass with a couch of ground chalk and weak size.

Afterwards, further absorption may be prevented by passing a strong varnish over any part that it may be desirable to repaint.

This method offers not only the advantages of greatly economising the time, both in the preparation of the canvass and in the laying in of the picture, but it renders the colours more brilliant, and less subject to change; for cloths primed in the ordinary way retain the oil of the colours between the ground and the last couches of paint, and thus remain a long time without drying, and finally react unfavourably on the colours; whilst on distemper grounds the superfluous oil is carried into the back of the canvass, or the interior of the wood if the ground has been laid on a panel.

CHAPTER VI.

ON THE PRESERVATION OF PICTURES, AND THE METHODS USED FOR RESTORING THEM.

I HAVE already mentioned the influence that light and air have upon colours, oils, and varnishes. There are very few colours that will not be greatly changed by the direct and continued action of light; therefore pictures must not be exposed, except for a short time, to the action of the sun's rays.

It is equally true that the oils and fatty substances take a yellowish tone, more or less dense in proportion as they are placed in the shade, and in situations where the air is bad. Hence it is obvious, that the best situations for preserving pictures are well ventilated halls, lighted from a northern aspect.

The varnish also with which such works are covered, assumes a yellowish tone, and loses its transparency in a longer or shorter period. When

this goes so far as to injure instead of serving the picture, it must be removed, and another substituted for it,—an operation of little difficulty if the varnish is of the ordinary kind, composed of mastic dissolved in oil of turpentine. But some artists having employed oily varnish, such as copal for instance, it becomes a difficulty to remove it; yet in every case, even where the softer varnish is to be removed, great caution must be used to prevent injury to the glazing.

The common method of removing the varnish is by rubbing the surface with the ends of the fingers, previously dipped in some resinous powder. By continuing this rubbing for some time, the varnish will give way, and may soon be completely removed. To prevent the epidermis of the fingers from being carried off by this process, fine fish skin is much employed. In either case the dust ought to be frequently wiped off, to ascertain that the picture is not receiving any damage.

The other way of removing the varnish is by applying a mixture of alcohol, spirit of turpentine, and oil, in the following manner: take a little bag of cotton in each hand; one of these is to be dipped in the above mixture, the other in pure oil. The operation is to be commenced by rubbing with oil

the part to be deprived of its varnish; the spirituous mixture is then applied, and the varnish dissolves rapidly: for this reason the rubbing must be continued only for a few seconds, and then the action should be stopped by the application of the oil. Without this precaution, there would be a danger of disturbing a part of the colour; and the bag holding the dissolving liquid should also be looked at every moment, to observe whether it has attacked more than the varnish; and as the power of dissolving the varnish depends upon the quantity of alcohol employed, it would be better to use too little of it at first, rather than, by making it strong, endanger the painting.

To restore pictures to their original freshness does not present any great difficulties when they only suffer from the varnish having become dark by time; but when, after a long course of years, they have been exposed carelessly to the action of unfavourable circumstances,—when the canvass is rent or half-rotten, when the joints of the panels are open, and the colour is ready to fall off by the slightest touch, it would seem as if they were then past all cure. Yet, however great and imminent their destruction may appear, there is a method of saving them, by taking the picture off its ground, and

laying it on a new canvass: this is called "lining the picture."

It is requisite to put a new cloth to the back of the picture when the latter is cut or torn, or even when the edges are so much worn as that they will not bear to be again nailed on the stretcher. In such cases it is probable that the picture may adhere firmly to the canvass; of course, it will be quite sufficient to glue the new cloth to the back of it.

In each case the operation is commenced by pasting some paper on the surface of the picture, that it may be handled without danger; and sometimes it is requisite to paste several sheets of thin tissue, one above another. If the old cloth is to be removed, it is of the first importance that the paper should adhere closely to the surface; therefore gauze paper is first to be pasted on, and this lets the air through so easily, that then there is a complete adhesion.

Should the picture be very dry, it will be proper to apply beneath, several couches of oil, mixed with a little spirits of turpentine; this will penetrate the dry mass, and secure the parts which are ready to drop off; but as the paste will not adhere to a greasy surface, it will be requisite, after having

well washed the picture, to apply a weak solution of soda or potass, to remove the greasiness. The best paste which is employed in this operation is made with equal parts of Flanders paste and fine barley meal. This mixture is preferred to that made of wheaten flour, as it keeps much longer soft, and is not so liable to crack. The paper should be very thin, and also very even and smooth, with little size in it.

Having thus securely fixed the picture, the operators next proceed to remove the old canvass; this will not be difficult, should it have been prepared with paste previous to the priming. It will be sufficient, in that case, to moisten it with a wet sponge; the paste will soon dissolve, and the cloth can be easily removed. But if there is no paste under the priming, then the cloth must be removed by pumice stone or a fine file.

For the re-lining, the usual method is to strain a new and strong cloth of an even surface upon the stretcher, to rub it down smooth with pumice stone, and then to give it an even couch of paste, a similar couch is then to be applied to the back of the picture after it has been freed from all inequalities; it is then to be placed carefully upon the cloth, taking care to press it so gradually as to expel the air

that would otherwise remain, and render the surface uneven; the pressure should be from the centre to the edges; when the paste is nearly dry, a smoothing iron should be passed over the surface; it must not be hot enough to endanger the picture, but sufficiently warm to melt the gelatine contained in the paste, which will thus be driven into all the fissures, and it securely binds the parts that are likely to scale off. The advantage of this operation is to render the surface of the picture even; the iron must therefore be passed over several times, beginning always at the edge, where the moisture remains longer on account of the frame impeding the action of the air; the picture is then to be placed in a dry room for some days, and nothing more is required than to detach the paper which had been pasted on the front of the picture; this must be done with a wet sponge.

In this operation, care must be taken that the dampness shall not raise the edges of the painting; this disadvantage would be obviated, by first pasting upon the edges of the frame some bands of paper, which would extend a little way on the surface of the picture.

It frequently happens, that when the paper is removed, some impressions of the margins of the

paper remain on the surface of the picture, especially if the paper employed was of a strong kind; to get rid of these marks, it is requisite to paste some fresh paper, of a very thin and fine texture, over the picture, taking care that the new sheets shall be so laid on, that the middle part shall cover the old traces; and, in passing the iron over them, it should only be used above the part to be rendered smooth.

If the canvass be but slightly injured, it may be repaired without relining the picture, by fixing to the back of the injured part several stripes of gauze, to be placed one above another, with a strong cement composed of ceruse, and very fat oil; then place upon the part, a piece of marble or board, with a weight to keep it even, and allow it to remain so for a day or two.

Should the picture happen to be on a panel, the same process of cartooning the surface with gauze and paper must be employed; when this is quite dry, the picture is to be laid flat upon a very smooth table, and by means of a tenon saw properly mounted, to prevent its edge from penetrating to the picture, the panel is then to be sawed into little squares, which are easily removed with a chisel; in this way the picture is gradually ap-

proached without danger; and, then by the use of a fine plane and files, the wood can be reduced to so thin a state, that by moistening it with a sponge, it can be easily removed, and the original distemper ground is thus uncovered; this ground is also to be removed, as it is commonly full of cracks; the re-lining is then to be completed as already described.

But when a panel is only damaged in some places, if the wood be sound, and the painting is partially in danger of scaling off, these local injuries may be remedied, without taking off the picture, by merely spreading over the bad parts some hot strong glue, which will penetrate through the cracks, and under the scales; when the size has set, all that remains of it on the surface is to be removed, and paper is to be pasted on the part with thin paste, when dry a warm iron is pressed over it; this softens the size evenly under the loose parts, and makes them adhere solidly to the ground; with the glue an eighth part of white drying oil should be combined; this would render the parts less accessible to humidity.[1]

[1] It must appear rather extraordinary that the oil should combine with the size, yet experience constantly proves that this combination does take place, and that this mixture gives a better resistance to both the alternatives of dryness and moisture.

When a panel is split or warped, the remedy is to glue at the back of it a sort of grating, made of deal; this is only glued in those parts which are in the direction of the grain of the panel; the cross bars are kept in their places by grooves made in their thickness; these are not glued on the panel, for they could not solidly adhere to it; but they serve by their pressure to sustain the surface, so as to prevent any further tendency to depression or warping.

The removal of a picture from a wall, is not attended with greater difficulties, except that it cannot be approached at the back as in other cases. When the front of the picture is properly cartooned, a groove is to be made in the surface of the wall around the picture, large enough to allow of a chisel being admitted, to detach the cement on which the picture is painted from the wall; this plaister is not more than from two to three inches in thickness; it is easily separated from the wall, and adheres closely to the picture.

As the cement separates from the wall, the picture is rolled on a large cylinder, to be removed; the cement adhering to the picture, is then to be carried off by the help of a chisel, and is an operation requiring much patience and great skill.

Should the picture have been painted upon the stone, without the intervention of mortar,[1] it still may be taken off in the same way that trees are barked, with the aid of a chisel indented like a saw, and whetted in such a way that its edges will slowly penetrate the edge of the wall.

When a relined picture is to be placed in a situation exposed to dampness, an oily mordent must be used, instead of our compound of paste and size; it is similar to that used by the gilders. Several pictures in the Musée (Louvre) have been thus relined successfully; the adhesive matter is composed of thick linseed oil, slowly simmered over the fire, and ground with ceruse, and a small portion of minium, very finely incorporated together; then with a firm brush or the knife, an even couch is to be spread over the lining, and over the back of the picture; in a short time the paste sets, and this moment is the proper time to lay the picture on the canvass, and by careful pressure to unite their surfaces. The taking off, and relaying the picture being completed, it now remains to clean it up, and to retouch the parts that have been injured.

[1] The cieling of St. Genevieve's Church is painted upon the stone, which is prepared merely with a couch of oil combined with resin and wax. See the article, Priming on Walls.

For the first of these purposes, which is a very delicate operation, various means are employed, which succeed in the hands of an experienced artist, but are rather dangerous when attempted to be used by the ignorant persons, who too often undertake this nice work.

It would be quite an error to suppose that the alkali and soaps can be safely employed in this operation, even though their strength may be very much attenuated with water. Even the latter, used in its simplest form, does much mischief to pictures: when very dry, it can dissolve certain colours, and, penetrating through the cracks, it augments the aridity of the paint, and tends to detach it from the ground. The better way to begin is by impregnating the picture with oil unto saturation; and for this purpose the Flemings use poppy oil, but nut oil is equally good on these occasions, or even linseed oil, as it bleaches equally as well as the others when exposed to the action of light. The surplus of the oil which has been laid over the picture penetrates the dry colour, and adhering to the canvass, firmly secures the parts which are scaling off.[1]

[1] For this purpose oil thickened by exposure to the air has been used with success, when tempered with a little oil of turpentine.

After this has been done, the picture may safely be washed with the alkaline solution. I have seen even the black soap used with success on these occasions, although it is very corrosive; but it was neutralized by being mixed with a proper quantity of oil, which prevented its acting on the colours. It is allowed to remain for some days on the picture, but produces no other effect than by merely softening the old soiled crust of varnish: this is then to be washed off with a sponge, and the picture is then found to be almost completely cleaned. This process is always dangerous when attempted by ignorant persons. The alkaline solution, and even soap, will carry off, in a great degree, the old varnishes, particularly when they have become rancid, as they will then unite with those substances.

When the crust has not been thus removed from the hollows and marks of the canvass, care must be taken not to rub the part much with either brush or sponge, because that would endanger the removal of some of the colours near it; but the fine fish skin must be used with great caution. A toothpick will sometimes serve very well for this purpose, or sometimes a finely pointed steel blade.

In the commencement of this article it has been

shown that the varnish can be removed by a mixture of alcohol, spirits of turpentine, and oil. This will also serve to clean the picture; but the choice of the materials should be determined by the actual condition of the picture: for instance, should it have been done with white of egg, this can only be removed by water; but if oily varnish, such as copal, has been used, it will be very difficult to remove it. For this purpose, it must be rubbed over with spirit of turpentine and oil, or even at times with weak alcohol, holding in solution a little potass: the fish skin will then remove it.

When the picture is cleaned completely, it will then be time to examine and repair the injuries which it may have sustained. The holes, if any, must be filled up with glue, or size, and white chalk, such as the gilders use. This stopping must be brought even with the surface of the picture. Should the canvass be bare in parts, this substance must be laid on it thinly, and a bit of similar canvass pressed upon it, to give it the impression similar to that which is under it. When these parts are settled, the retouching with colour is the next consideration. For this purpose it is the practice of the greater portion of the restorers, or "picture cleaners," as they are sometimes called,

to apply a thin couch of varnish to the picture previously. This is done to bring out the original tone of the picture, as a guide to the new tints: hence it must happen, that in taking the varnish off at a future time, the repainting which lies over it will also be removed. I think a better mode is to prepare for retouching by rubbing a little oil on those parts. This will equally bring out the colour of the picture. The oil is then to be wiped clear away; the colours become duller, but are bright enough to guide the operator; they seem paler, because they are not varnished. This is not a disadvantage, because oil colours deepen in tone when dry; therefore the tints ought to be kept lighter than those of the original painting, that when dry they may come to the same tone exactly. Besides, as it is most difficult to imitate the tints of the old pictures, except by glazing, it is decisive that the repainting should be kept brighter.

But of all the accidents to be met with in the process of restoring pictures, to remedy the cracks presents the greatest difficulty, and the restoration is not often practicable when the cracks take place in very old pictures. The parts so separated cannot be brought together: filling up the spaces with colour is all that can be done; but if the picture

has only been painted a few years, and not thoroughly dry, it is possible to bring the separated parts together. For this purpose it will be sufficient to remove the varnish entirely, and lay the picture quite flat: in time the parts will dilate, and finally unite so well that the cracks will totally disappear.

From the above it is pretty clear, that it is running a great risk for any one to attempt cleaning a picture who has not had good experience of the proper methods to be used. It would, no doubt, be better that a clever painter should perform these operations with care, since he would best understand the merit and value of the work; but previously to undertaking such a task, he should make trials upon a sort of pictures, that if he spoiled them it would not be regretted; and whatever success he might have, he should not believe, that he could succeed in all cases; for those who have occupied themselves for many years in such restorations should not flatter themselves with the notion that they have overcome all the difficulties. They should always cautiously proceed to try some of the unimportant parts of the picture, and adopt that process of cleaning which they find most desirable.

CHAPTER VII.

THEORY OF THE PRINCIPLES OF HARMONY IN COLOURING.

THE greater part of the writers who have treated on this subject have felt, that to inspire their readers with confidence, their precepts ought not to be fixed arbitrarily, but merely deduced as consequences of the natural arrangement of colours.

Paul Lomazzo, the most ancient of these authors with whom we are acquainted, commences his chapter "On Colours" by stating his ideas as to their physical properties, and the manner in which they are generated; but his theory is not calculated to support the doctrine which he has deduced from it.[1]

[1] "There are," says Lomazzo, "seven colours; of these the two extremes (the black and white) seem to be as the parents or generators of the series. The five central ones *(i cinque mezzani sono, il*

Rubens is said to have written an essay in the Latin language, entitled *De Lumine et Colore*. This manuscript was, it appears, about fifty years ago in the library of M. Von Parys, a canon of Antwerp, who was a descendant of that great painter.[2] I do not know what has become of it, or why it remains unpublished to the present day. The properties which Rubens attributes to colour are not exactly conformable to sound physical principles; but should he have laid down some rules of harmony, there can be no doubt that they would be deduced from accurate observations.

Gerard de Lairesse has, in his essay on painting, gone very much into detail on the harmony of colours; but his views of the subject are too empirical.

Mengs, who has with more clearness explained the principles of harmony in painting, establishes his views upon the true physical principles; but as

pallido, il rosso, il purpureo, e il verde). Thus he has announced five colours, and he has enumerated only four, leaving out of his reckoning both blue and yellow; for we cannot suppose that by pallido he means yellow; and what he has added upon the generating of colours is quite absurd.

[1] It was from the Canon *Van Parys* himself, that I heard of this treatise; and he promised me that I should see it. I have to reproach myself for not having urged the Canon to keep his promise.

he supposed that all painters understood this, he has neglected to elucidate his theory by any demonstrations.

That theory is now established, so far as painting is concerned, under the term *colorization*, or the combination of colours.

Although the greater number of scientific persons regard it as a demonstration, that the colours which are produced by the decomposition of the rays of light are not reducible to three, and that each coloured ray, as it proceeds from the prism, presents a simple indecomposible colour, they are of the same opinion with painters as to the results derived from the mingling of these rays, as, for instance, by uniting a blueish portion of one spectrum with a red portion of another spectrum, a violet colour is formed. Orange and green are formed by other binary mixtures, but they have not explained how it is that a compound colour should produce upon the organs of vision the same sensation as one simple colour. However this may be, and regarding them merely as to the sensations which they produce upon the eye, and without reference to their physical properties, I do not find my opinions opposed to those of men of science in this theory of colouring.

THEORY OF COLOURING.

Although painters usually have arranged on their palettes a good many pigments of various denominations, yet they do not always seem to know, that three simple colours (yellow, red, and blue) can, by proper combination, be made to produce that great variety of tones and colours that we find in nature.

United in pairs, these three primitive colours give birth to three other colours, as distinct and as brilliant as their originals; as thus, the yellow, mixed with red, gives the orange; the red and blue, violet; and the green is obtained by mixing blue and yellow, and, according to the preponderance of one or other colour in the mixture, will the tint incline towards that colour; and as these proportions are graduated, we pass progressively from one colour to another, and from whatever point we begin, we return to it.

This being the case, we ought to consider the chromatic scale as a circular zone, upon which, at equal distances, should be placed the three primitive colours,—the intervals between these being occupied by the colours formed from their unions, softly gliding into each other, so as to leave their

point of junction scarcely, if at all visible. It is not easy to determine with certainty what number of tints may be produced in this manner. The more the eye is accustomed to these exercises, the more easily will it discover the divisions or gradations; but even those who have little experience do not mistake orange for red, or blue for violet, &c.; but they may, and do confound, under the generic term red, both crimson and scarlet, although there is as much difference between them as between red and orange, the yellow and green, or any two of the six colours.

It is clear, then, that the chromatic scale is composed of six distinct divisions, namely, yellow, orange, red, violet, blue, and green.

These may be subdivided into an almost endless variety of tints, according as the will of the artist may direct the predominance of one or other of the primitive colours in his tints. He makes them incline to the yellow, red, or blueish hue, which gives all the varieties of the orange, violet, and green.

Newton was, I believe, the first who observed the circular arrangement of the chromatic scale, from certain affinities which are known to exist between musical sounds and colours. He conceived that the similitude extended much farther, and, by analogy, he divided the scale of colours into seven parts or

spaces, similar to the gamut; but finding only six distinct terms in the language that he could appropriate to this purpose, he was obliged to denominate as "indigo" the intermediate colour between blue and violet.

This arrangement of the colours gave rise to an important circumstance in painting, which was, that by mixing together the primitive and secondary colours a complete discoloration is effected.

In fact, so long as the combination of the primitive colours is restricted to only two of them, the product is then as brilliant as the colours of which it is composed; but the instant that the third colour is combined with them, the mixture becomes dark, and in case that neither of the three colours predominate, the tint produced will be a neutral gray, and, of course, will be quite colourless and more or less dark, according to the intensity of the colours employed.

But in the chromatic circle the arrangement is such, that the colours diametrically opposed to each other always offer the union of the three primitive colours, if one be simple, the other is a compound of two, they are always reciprocally complementary. As, for instance, yellow is opposed by purple, which is compounded of red and blue;

opposed to red we have green, a mixture of blue and yellow; and orange, composed of red and yellow, is the opposite to blue.

Nature points out to us these oppositions in the various phenomena of the decomposition of light: as, for example, in the coloured circles, naturalists have observed that the colours reflected, and those directly transmitted, are complementary to each other, and discoloration takes place the moment they become united.[1] In the variety of colours presented by the polarized light, the ordinary and extraordinary images are exactly in complementary opposition to each other.[2] Each colour is not

[1] If a glass, which is slightly convex, be placed against a flat glass, and both are pressed together, the pressure causes the appearance of various coloured circles in the air confined between those substances. These tints have their common centre in the point of contact; and in proportion to the strength of the pressure will the number of circles increase. But they grow weaker as they recede from the centre, until they gradually disappear.

In examining these circles by looking through the glass, they still preserve their colours: but the colours on each side are different, and are the complements of the preceding circles. As, for instance, those of the first ring, viewed by reflection, are in the following order:—blue, white, yellow, and red orange; whilst the same ring, viewed by transmission, produces the red orange, black, violet, and blue.

[2] When we look at a luminous point, through a double reflecting crystal, we perceive that one of the two images which present themselves is moveable; and on turning the crystal in the same place, this image follows the motion, and turns round the

only susceptible of a degradation of tint in its combining with another colour, but may also be made lighter or darker. This modification of brightness, or intensity, is called the degradation or lowering of tone, or of the *chiaro 'scuro*. For in proportion as the colours become brighter, they approximate to

other image. To this moving figure has been given the epithet of "extraordinary," as opposed to that which is fixed, and which obeys the ordinary laws of refraction.

With regard to the polarization of light, it is a natural and peculiar quality with which that body is endowed, under certain circumstances and conditions, either by reflection or refraction. To give an explanation of this phenomenon, it will be sufficient to remark, that any ray of light which is reflected upon a crystal, and forms with it an angle of 35° 25′, does not comport with a direct luminous ray; for it does not give any reflection when it falls upon a crystal properly placed for it, and it does not further divide in its passage through a double reflecting crystal, in a certain position. This ray is polarized; and the qualities described may serve to distinguish it from a natural ray of light.

Those peculiar properties are not the only ones that develop polarized rays; for they can further display very lively colours and numerous shades of difference, which the natural rays never show. These colours develop themselves more especially when a polarized ray traverses thin plates of certain crystals, such as mica, sulphate of lime, rock crystal, &c.

To ascertain this fact by experiment, it will be sufficient to place a thin plate of any one of these substances, across the direction of a polarized ray, and then to look at it with an achromatized prism of Iceland spar, both the images will then be coloured; and it is their various shades that are always complementals: for in superposing them, a complete absence of colour is perceived in the parts thus treated, at the same time that the rays close to them still retain their colours.

white; and as their intensity augments they approach to black. Therefore, in the arrangement of the chromatic scale, we may place white in the centre of the circular zone, and black on the exterior line, and then lower the tones from the brightest to the most intense shades.[1]

Both black and white are for painters very essential materials in colouring, as with them all the colours are gradated, being either raised or lowered in tint, to express the effects of light or shade in all their gradations. But considered in an abstract sense, these two pigments are not true colours; the proof of this is, that if in the purest mass or surface of white, the eye can discover the very slightest indication of colour; then the white is no longer pure. We should also observe, that the finest of our whites will appear grey when opposed to the brilliant light reflected from a bright coloured substance; such, for instance, as burnished gold which is yellow, or chains of other coloured metals. But if we could obtain red, yellow, and blue as luminous, as these reflections thrown off

[1] It must, however, be observed, that all the colours cannot be so lowered down; the yellow, for example, is essentially bright; as are also the orange, red orange, &c. There is, therefore, only a part of the chromatic scale that can be brought down to the black shade.

by those brilliant coloured bodies, we should be enabled to compose a white, that in vividness would quite surpass the most brilliant whites of our palettes.

As to the black, every young pupil in painting knows how to produce it of all grades, with prussian blue, lake, and brown pink. But if a pure black may be obtained, by means of the three primitive colours of the greatest intensity; and if in mixing these colours of the lightest tints, the compound resulting from it should approach to white, we then have an argument in proof that black and white are not true colours, although they are essential materials for colouring; and we might fairly assert, that in fact the mixtures were only greys, one of them being extremely clear, and the other extremely dark.

The chromatic scale includes only the brilliant hues of colour. These of a lower and imperfect tone, are much more numerous, though still governed by the same laws; but, it must be understood, that the distinct resemblances grow weaker, exactly in proportion, as the changes in the colours are made stronger. To explain this more clearly, suppose we place a chromatic scale at the entrance

of a dark recess, and gradually move it into the shade, it will be seen that the distinctions between the colours, become more feeble as they approach obscurity.

With respect to what has been stated, as to the binary mixtures of the primitive colours being equally brilliant, as the original elements of which they are compounded; that is only the case, as regards the combinations formed by nature, not in the combinations of our pigments; as, for instance, the orange, minium, and some of the natural green tints, are much more brilliant than any combination which we can produce with green and blue, or yellow and red. Or, if we combine two luminous coloured rays, and throw them on the same point, we shall then produce a colour as bright as the elements from which it may be formed.

Having thus stated the theory of colouring, as founded upon the natural properties of colour; I shall now endeavour to deduce from it the principles of harmony, as applicable to painting; and by this means, fix them upon their true foundation.

Harmony, as its etymology implies, awakens in our minds the ideas of *relationship*, *union*, and *accordance*; this term may therefore be applied

to every portion of the art; but in this instance we are only to treat of harmony, as connected with colour and *clair obscure.*

In a picture, the harmony of its colouring is always attended by that of its *chiaro 'scuro;* the latter, it is true, can exist independent of colour, as we see in seppia or chalk drawings, engravings, &c., which are pictures without colour; it is proper, therefore, to examine separately these two species of harmony.

Musical harmony is founded upon the strict observance of certain intervals, fixed by nature between sounds, and so unchangeable, that the slightest infringement of this law, will offend a truly musical ear.

In painting, although the combination of its colours is governed by positive laws, yet harmony does not result from certain fixed spaces between the tints, neither does a shade higher or lower between them, injure the harmony of a picture. Indeed, if this were the case, a picture would be like some sort of musical instruments, reduced to a state of discord very soon, on account of the alterations which inevitably take place in the tones of the colours.

A picture is said to be "harmonious," when it

presents to our senses an arrangement of light, shade, and colours agreeable to the eye; and it is pronounced "discordant," when in some parts it offends the sight by strong ill-judged oppositions. But as we judge definitively of harmony according to our sensations, we must recollect that these depend not only upon our peculiar organization, but still more upon the state of these organs at the moment of receiving the impression. Thus the light is painful to us, as we meet it on coming out of a deeply obscured place; but it is agreeable, and we bear it very well, when we are exposed to its increase by slow degrees: precisely in the same degree would the opposition of brilliant colours offend the eye, if there was not at hand some vacant space or quiet colours, whereon the sight could repose; and then the brightest and richest colours would convey agreeable sensations, if they were gradually unfolded to our sight; our eyes regard with pleasure the golden and the purple clouds, which often accompany the rising and the setting sun; and yet there is no comparison will hold between the brightness of these splendid tints, and the terrestrial materials of our pallettes.

After having shown that the colours must not offend the eye, and that the intervals between the

tints, and the tones are correct, still these will not be sufficient in themselves to produce harmony; and the great object of the art, which is to give pleasure to the mind, will not be attained if the *artist* is content with giving merely a tame unoffending subject, delicately handled, and in placing before the public a monotonous gradation of light, shade, and colour.

Harmony in painting is therefore the result of *an arrangement of positive colours and tints, which attract the eye, and fix its attention by a judiciously managed succession of repose and opposition.*

Powerful oppositions are so far from injuring the harmony of the composition when judiciously managed, that they give to it great animation; but when the colours are very powerful, the eye requires ample quiet spaces near them to repose upon, and obtain relief from the strong impressions made upon it.

According as the colours are more or less brilliant, and the intervals between them are greater or less, and also according to the management of the *chiaro 'scuro*, will the harmony of the work take its character, and be distinguished by the terms soft or mellow, powerful, dark, or brilliant, &c. One of the greatest difficulties of the art, is to

make the harmony of colour in the picture accord exactly with the subject; in this point some, even of the great painters, have occasionally failed, for it is so natural to feel preferences for certain colours, and certain modes of opposition, that unknown to himself, the artist reproduces them in his works, whatever may be the nature of the subject. Rubens for instance, has placed the same brilliant draperies in the pictures of "the adoration of the magi," and of "the crucifixion." Would it not have produced a grander effect, if in such gloomy scenes he had used colours of a graver character, such as we see in the great works of the Italian school?

In nature we are presented with examples of every species of harmony, and many also of discord; but the latter are most frequently the work of human hands, as we see in the choice of colours for clothing, which are often of the most discordant hues and fantastic combinations; and especially those of the soldiery, which are probably calculated to be seen at a distance; or looking at a number of persons in motley dresses of gaudy colours strongly opposed to each other, reflecting the light which falls uniformly upon them. This spectacle offers no point of harmony; but should the same mass become

harmonious by a particular disposition of the light and shade, the harmony so produced would not, in that case, arise either from the choice of subject, or the arrangement of colours; it must be entirely attributed to the light and shadow, which have the marvellous power of rendering harmonious and reducing to order the most discordant colours.

Our eyes are affected in a different manner by each of the colours.

Yellow, which is the brightest of them, reminds us of some effects of the sun.

Red produces a very lively impression upon the organs of vision; as also do in different degrees the various tints in which it predominates. The vermilion or scarlet is the most attractive, as it unites to the liveliness of the red a little of the brightness of the yellow.

Blue, the most intense of all the colours on the chromatic scale, possesses neither lightness nor vivacity; it is the coldest of the three original brilliant colours.

Green, which holds a middle station between the light and the dark, produces a refreshing effect upon the eye, which increases when it is made lighter by the addition of more yellow.

Thus we find, by analysing the chromatic scale, that one portion of it is composed of clear and vivid colours, and another part contains those tints that are of a cold and grave colour.

However, the character of each colour changes in proportion as it happens to be used of a darker or lighter tone. Light blue or violet are lively colours, but are quite different when of a dark hue. The addition of black would carry the alteration still lower by rendering them of a gloomy cast.

In lowering the tones of colours, it is always in the medium tones that they have the greatest lustre; and it is not by the addition of white that the colours can be rendered more brilliant: this produces upon bright clear colours the same effect that black does upon dark ones.

In some pictures, even of those by the great masters, we not unfrequently see draperies of which the lights appear tarnished in comparison with the half tints in the picture. To give the harmony of nature, the artists ought to have kept down the tones of the half tints and shadows, as they found that they could not obtain any additional brilliancy in the brightest parts of their works. And this is the practice of the colourists.

Some authors, in expounding the principles of

harmony in colouring, have described several of the opposition tints by the name of antagonist colours. If by this term it had only been intended to say, that by mixing these colours with the others that operation would destroy the brightness of the latter, and produce merely a gray tint, they would only have stated a fact that could not have escaped the notice of even those who were the first that attempted the mixing of colours. But these authors pretend to say, that such colours cannot be placed close to each other, without producing a discordant effect. In this assertion, however, they have gravely deceived themselves; for the colours which destroy each other by admixture, and only produce by this process a grayish tint, always present the union of three colours, and produce, no doubt, the strongest opposition which can exist amongst these colours. But this species of opposition does not destroy harmony, except when it is not properly and judiciously arranged; and when so opposed, the colours have the effect of attracting and interesting the spectator.

Amongst the class of antagonist colours these writers have placed the blue and the orange. These two colours do in fact afford the strongest opposition in the whole of the chromatic circle, because

in that situation they are placed between a primary colour the most intense, and a binary compound of the brightest description.

Paul Lomazzo, and, long after his time, *Gerard de Lairesse*, looked upon, and properly described the yellow and the violet colours, as harmonising well together, and these authors did as decidedly declaim against the placing of green and red near together, because, as they stated, these two colours formed a most discordant opposition to each other.

The opposition of yellow and violet is certainly the least powerful of any of the extremes, because in themselves they are the least brilliant; yet as they are directly opposed to each other upon the chromatic scale, and the mixture of them presents a union of the three colours, or gray, their opposition to each other must of course be considerable.

But the opposition between red and green is certainly stronger than that last mentioned, because red is the most brilliant of all the colours; but this is an opposition to which we are accustomed, for nature constantly presents it to our eyes in the flowers, fruits, plumage of birds, mother of pearl, &c. &c.

I consider it as a part of my duty to notice these

errors of authors of celebrity, to show, that although it is by our eyes that we definitively judge of harmony in painting, as by our ears we judge of musical concords, we should not place too implicit a reliance upon these organs at all times, because they are sometimes imperfect or incorrect, through various habitudes or prejudices, when these are opposed to known principles; and we should only admit the testimony of our senses when we are sure that they are conformable to the laws of nature, and founded upon long experience, which cannot lead to error.

I am quite satisfied that it is not by the assistance of an exact system of colouring that the great men of the Venetian and Flemish schools have discovered and adopted the most proper oppositions, by which colours might be so managed as to give the highest value to each other; but the artists have not all been equally aware of the resources of their palette; and whenever it shall be within the power of an artist to succeed, by his own exertions, in truly ascertaining the relative value of colours to each other, it is evident that he may save his young pupil from many barren essays by making him, in the commencement, compose a chromatic scale, which will only cost him a few

minutes' time to complete, and thus to give him some ideas upon the harmony of colouring more true and more useful than any that he could acquire by long groping in the dark recesses of theoretic speculation.[1]

Besides this, it is important to observe, that the objects which attract our sight have such an influence upon the visual organs that they can vitiate them very soon. It should be pointed out to the pupil, that, in painting from the same model, he may finish a suite of studies: in each of these he will exaggerate, involuntarily, one particular colour in such a way, that when all the studies done within a short space of time are collected together, it will be seen that he has exaggerated every colour of the scale.

To prove this fact it would be sufficient to set him at work, for five or six days in succession, upon drapery of a brilliant colour, and immediately after this set him to paint from the living model for one day; and it will be seen that he has exaggerated

[1] The formation of a chromatic scale, carefully composed, would teach a pupil, not only the natural relationship of colours to each other, but still more, the solidity of each of them. They would also indicate the hiatuses which should be filled up to complete the scale; so that all the colours of which it might be composed should be brilliant in an equal degree.

all the tints of the model which approached the colour of the stuff which he had been painting, because his eye had been dazzled, and had imbibed the impression of that colour.

But in case of the organs of vision being so much prejudiced by a particular colour, this fault may be corrected in time in those who have a natural tendency to exaggerate tints generally, and simply by exercising the eye upon the colour opposed to that which has been exaggerated.

These observations are called for to oppose a prejudice which is very common, namely, "that by dint of hard and close application to painting, a person may become a good draughtsman; but that the science of colouring is the gift of nature, and cannot be acquired by study."

A little reflection, however, will soon discover that this idea is very ill-founded, if we closely examine the points in which painters, not remarkable for fine colouring, often deceive themselves with respect to colours; and if we would observe, that in the "schools of colour," it is always by that special quality of these schools, that their ablest pupils are distinguished; we must then come to the conclusion, that if mere study could produce an able designer, the same process might equally

well produce a fine colourist. There is a letter of Poussin's from Venice, which contains this appropriate sentence: "*it is quite time that I should leave this place, as I feel that I shall become a colourist.*"

We shall now ascertain what practical advantages may be derived from the following ideas, which I now offer upon the physical properties of colours.

I shall, for example, take one of the brightest colours, and most difficult to render harmonious, light blue: and we will suppose that it should be made to appear in its highest state of brilliancy.

Now, if we examine the chromatic scale, we shall perceive that the orange colour is its direct opponent, but the orange is also brilliant; and as they are equal in brightness of tone, they are equally objects of our attention; but supposing that we should attend particularly to the blue, in such case you must employ orange of the gravest tone, or it will be impure, for it is naturally bright; but it will still be composed of red and yellow, giving the colour opposed to blue, and the opposition will rather be increased, because it will exist not only as to the colour, but also in the increased depth of tone.

A painter is not always sufficiently master to choose, according to his own taste, the colour of the various

objects that enter into the composition of his picture, and even when he has this choice in his hands, perhaps it will not allow such an arrangement of effect as he would have adopted; from whence will result a union of objects the colours of which will not be modified by light and shade.

It is clear, that should he adopt colours fiercely opposed to each other, they will appear at some distance, as if cut up like the colours upon our court cards; it will therefore be judicious, in a case where the colours cannot be modified by shade, or by toning down, not to employ those that have a strong opposition to each other, either in tint or tone. Under circumstances the most unfavourable, in which the colours must be of particular hues; and when they contrast in a very discordant manner, of course harmony is out of the question, except in restraining the opposition as much as possible, by restricting the light by an intelligent arrangement, and judicious execution of the work.

From these facts, we may draw this inference, that as by the masses of *light* and *shadow*, we are enabled to avoid all the discordances of colouring; it follows that particularly *chiaro 'scuro* should be studied by those who aspire to become colourists.

It is certainly a great advantage, that we should be enabled in a pictorial composition, to distribute the lights and shadows with a degree of art, by which the discordancies of colour may be avoided, and that only requires the artist to add a happy choice of colour, to a harmonious disposition of light and shade.

Chiaro 'scuro exists independently of colour, but as it always accompanies it in nature, and as coloured objects are always subject to a lowering of the light, its effects therefore are so combined with those of colour, that they appear to justify to a certain point, the idea of their inseparable nature; in fact, a familiar expression in the arts, when examining an engraving or an original design, is "that reminds us of colour." It is therefore an art, to design or compose in such a manner as to give them full value to objects, by well managed opposition; and that art distinguishes the colourists still more than the correctness of their tints. This is the reason, why Raffael is never cited as an authority in colouring; although we find in several of his pictures, tints and colouring as true as the art can produce.

The pictures of *Caravaggio* and *Guerchino*, often display charming tints in the lighter parts but

the colour of the flesh is unnatural, from the too great strength of the shadows. It is true, that this extreme force contributes much to the grand effects which they generally display; but that vigorous executive power, would have been much more agreeable, if bestowed upon objects capable of supporting it.

To this mode of managing *chiaro 'scuro*, we shall oppose that system adopted by the colourists. We see with what discernment they have placed the strong shadows; they evidently were not ignorant, that clearness and brilliancy cannot be obtained without the vigour of strong opposition; but they had the judgment and skill, so to dispose the *chiaro 'scuro*, that its power was never carried over the interesting parts of the picture, because it would have deteriorated the purity of the colouring.

In fact, let us suppose that the figure of a woman has been painted in shadow, upon a bright ground, it is evident that though she might be of the most dazzling brightness of colour, yet that the brilliancy of the flesh tints would disappear so completely, that she would not be of a higher tone than a negress; but change the opposition, and in place of a light ground, substitute a dark one; and, further, let the figure have its proper reflec-

tions. Then we shall find that, although it is in shadow, the carnations will not appear at all debased in tone.

Titian has painted a great number of pictures, in which it appears, that he intended principally to display one of the qualities of female beauty, that is, the brilliancy and richness of the flesh tints; it is worthy of remark, that to obtain his object, he made use of light and shade in opposition; in fact it did not signify to him, that the skin was of a brilliant light tone; he would also express, that the circulation of the blood was in full activity, as the poets never fail to mingle the carnations of the rose, with the snowy whiteness of the lily. The opposition of a powerful back ground, becomes quite essential, to throw forward the brightness of the skin; and then the opposition of white draperies is brought in, and agreeably arranged to bring out the warm tones of the flesh.

Paul Veronese does not seem to have had, at least in the greater number of his pictures, any intention of giving particular brightness to his flesh tints; he seems only to have aimed at giving the effect that was most usually presented to his observation, in which the objects detached themselves boldly from the back ground by their local

colour; and this is in fact, one of the most powerful methods of separating the objects from the back ground of the picture.

At the first view, we do not perceive that this painter has employed any artifice in the arrangement of his colours, and we are tempted to believe, that he placed them as they presented themselves to his imagination; but upon a closer observation, we plainly perceive that he has not left any thing to chance. For example, in one of his finest works, (the Marriage at Cana,) the greatest number of the persons present, and especially those placed at the sides of the table in perspective, are detached from each other, alternating and opposing a strong coloured drapery to a light one, the latter being again opposed by one of a darker tone.

Rubens, who was born under a sky less ardent, in a country where brilliant flesh tints are by no means uncommon, was not slow in adopting Paul Veronese's system of effect; his object was to arrange the most brilliant colours together harmoniously, and he succeeded in so doing; but probably, being struck with the changes of tone that many of Titian's pictures had even then undergone, he thought it advisable to exaggerate the brightness of the carnation tints, in the hope that

time would soften them down to the true tone of nature.

No one understood better than Rubens, the principle of unity ascribed to Titian, of considering the whole subject of his composition as a bunch of grapes; his most powerful shadows, his principal lights are never in detached parts, but are constantly united in those situations, which are best adapted for giving to his groups a grand relief, and much of it flashing out upon the details of the work.

In his pictures, the various parts of which they are composed, as well as the arrangement of the *chiaro 'scuro*, are more systematically contrived, than those of Paul Veronese; the artifice may be more easily discovered, but still we do not the less admire them, when we call to mind, that it was by these means the artist had arrived with greater certainty at the end he proposed to attain.

CHAPTER VIII.

ON FRESCO.

FRESCO is the art of painting in size colour upon a fresh plaister ground. The name is derived from the Italians, who call it *dipingere in fresco*, in contradistinction to the *dipingere in secco*.[1]

It is well known that lime mixed with sand in certain proportions acquires a solidity from exposure to the air, and a hardness equal to stone. If a couch of finely-prepared colour is laid upon the fresh surface of this composition, it unites with these materials, and becomes as hard as the cement.

The great durability of this species of painting has been somewhat exaggerated. In proof of its

[1] The first means "to paint on the fresh plaister;" the other, "to paint on dry surfaces."

great durableness, many frescos are pointed out, which have been painted many centuries; but there are others of much more recent date, that have not equally well resisted the causes of deterioration.

Besides, we are not quite certain that the frescos discovered amongst the ruins of ancient Rome have been produced by the same means as those produced since the revival of the arts in Italy. The Egyptian paintings, which have been executed long anterior to those discovered in Italy, are in as good preservation as the Roman, and are only distemper colours prepared with animal size. No doubt the preservation of these specimens of ancient art is owing to the great dryness of the Egyptian climate; and this is not more surprising than that the miniatures of the twelfth century, which were preserved with care in the libraries, safe from the effects of atmospheric influences, are equal in permanence of colour to the most ancient paintings.

In many respects fresco has advantages which render it particularly fitted for the decoration of public edifices. It does not display the glossy brilliancy of oil painting, which has the disadvantage of not allowing more than some portion of the picture to be seen at once, and that from certain

points out of the influence of light reflected from other objects. From whatever point the spectator may view a fresco, the effect upon the eye is the same; because it does not receive any dazzling light to interrupt the visual ray.

The colours used in fresco, with the exception of blue, are not of a brilliant order; but they preserve the tone which they give when quite dry after completion. But in our climate, where buildings are in a few years darkened by the smoke, this art would not suit for the exterior; but it might be employed with great advantage in the interiors of our edifices, wherein these paintings would preserve their tints, without any visible alteration, even in places where white marble takes a yellowish tinge.

There is a good specimen of the permanent character of fresco in the paintings of *Romanelli*, which decorate some of the lower halls at the Louvre. The tints of ultramarine still display a surprising brilliancy of tone, which unites in harmony to the pictures.

Although the fresco pallette cannot display, either in extent or brilliancy, an equality with that of oil painting, nevertheless there are, in Italy, some frescos remarkable for their colours; such an effect might be the result of strong opposition, which are the

most powerful means of the great colourists. They adhere still, as I hope to be able to show, to the following process in the application of the colours.

It is now time to enter into certain details in the operations of fresco. As the duration of the painting is dependent upon the plaister which it covers, of course the mode of preparing this plaister is of too much importance not to be carefully attended to by the artist. Fortunately the composition of durable mortars, like those of the ancients, is not difficult to be understood or attained, as there are some excellent works on that subject, which we may take as our guides.[1]

Now, if the wall upon which a fresco was to be painted did happen to be composed of smooth stones, of a fine grain, like marble, this circumstance would be unfavourable; as the artist should then have to begin by roughing the surface, so as to allow the first couch of plaister to adhere firmly to it, that the work laid upon it might not detach itself from the wall.

The mortar of this ground should be composed of the best slacked lime with *puzzolana*, or granite sand, coarse enough to produce a granular surface,

[1] Delafaye, Fleuret, Vicat, Raucourt de Charleville.

capable of firmly holding the second coating; but the latter, which should be smooth, must have the sand passed through a sieve.

In the vicinity of manufactories of Dutch ware or porcelain, it is easy to procure the refuse of the biscuit, &c.; these materials, when ground, form with lime a white and excellent mortar, upon which the colours will appear more brilliant, because of its greater transparency.

We are told that the lime used in this preparation should have been slacked a year, or, at least, several months, to prevent the cracks that would otherwise inevitably take place, if the lime should be used in its native strength.[1] But I am strongly of opinion that, even if lime recently slacked were used, the recurrence of these gashes might be prevented, either by adding in moderate quantities carbonate of lime, or by keeping the mortar closely covered up from all contact with the external air

[1] There is not any difference between lime which has been slacked only a month, and lime which may have been slacked ten years; for the carbonic acid of the atmospheric air only combines with the mere surface of the mass of lime; it does not penetrate further. Therefore, the great body of the lime beneath this crust preserves its strength for a great number of years, and is completely fit for use.

for several days, and at the moment of using it, to beat it up well, but without adding any more water. The principal cause of these cracks in the plaister is owing to an excess of water being used. M. Vicat directs that the lime should be slacked with as small a quantity as possible of water, and that only sufficient to prepare so much as may be used on the next day. According to the advice of this skilful engineer, the lime to be employed must be stone lime, of the finest quality, and placed in a basin not porous; upon this the water is to be sprinkled by slow degrees, and in such a way that it may readily circulate in the spaces between the stones; this will allow the pieces to absorb the exact quantity requisite to resolve them into one strong compact mass of a pasty consistence, but by no means to allow it to run into a fluid state; neither must it be worked up and beat about by the hoe and rake, as we sometimes see so improperly done, with respect to the common lime mixtures.

In about twenty-four hours after the heat of the operation shall have subsided, this paste will have acquired so firm a consistence that it cannot be detached from its basin without the aid of a pick.

It is then rendered soft and plastic by a vigorous beating up, but without water; this is done by means of heavy iron mallets with wooden handles, which are struck perpendicularly upon it; then to one hundred parts of this tenacious and very substantial lime paste, sand is to be added in the proportion of from one hundred and fifty to one hundred and eighty parts; these materials are to be well kneaded together by means of a heavy pestle; but if, in defiance of the most vigorous efforts, and this always requires great exertions, it is found impossible to unite these materials sufficiently, then a little water may be added, but very gradually and with care; for it will hardly be believed by those who have not seen it, that a single pint too much of water will spoil a square foot of this mortar.

The plaister employed in the frescos of the fourteenth century, like those of *Cennino Cennini*, is composed of two parts of coarse sand, and one part of powdered lime slacked by the action of the air; both of which were passed through a fine sieve. Of this mortar so much was prepared as would be sufficient for two or three weeks' work, first taking the precaution of letting it remain undisturbed for some days before commencing to use it. Cennini

adds,[1] when you are preparing to give the first coating, begin by washing the wall well, and leave it damp, but not too wet; then take the mortar, having tempered it to a proper consistence with the trowel, and apply it in a couch or two, until the surface is perfectly even; and when this ground is about to receive another couch, care must be taken that the face of it is not smooth, but that it shall rather have a rasped surface.

When the first layer of plaister is dry, then the design of the picture is to be traced upon it; for this purpose charcoal is used, and the outline is then fixed with the pencil; this outline serves as a guide for the laying on of the second coating, which is only to be laid on partially, and as the artist advances the work, he only prepares as much ground at once as he can finish in the same day; this

[1] Quando vuoi lavorare in muro . . . . . prima abbi calcina e sabbione, stamigiata, o stacciata, ben l'una e l'altra. E se le calcina è ben grassa e fresca, richiede le due parti sabbione, la terza parti càlcina. E intridi bene insieme con acqua e tanto ni intridi. che ti duri 15 di o 20 E fasciala riposare qualche di, tanto che n'esca il fuoco: chè quando è cosi focosa, scoppia poi lo' ntonaco che fai. Quando se' per ismaltare, spazza bene prima il muro, e bagna lo bene, che non puo esser troppo bagnato; e togli la calcina tua ben rimenata a cozzuola: e smalta prima una volta o due; tanto che vegna piano lo' ntonaco sopra il muro. Poi quandò voi lavorare abbi prima a mente di fare questo smalto bene arrieiato e un poco rosposo.—*Cennino Cennini*, chap. lvii.

second coating ought not to be laid on thick, in a few instants it becomes firm enough to resist a light pressure of the finger; this is the time to apply the charcoal, and mark the outline of the part to be painted. In the ancient frescos the outline is cut into the ground? this would indicate that the artist, having chalked so much of his cartoon[1] with a transparent paper, as he wished to transfer, applied the chalk to the surface, and cut in the outline with a point; by such a mode there is no danger of losing the sketch during the operation of painting.

COLOURS USED IN FRESCO PAINTING.

These are but few in number; being confined to those that lime will not deteriorate, and which will not be altered by the action of the light. From these causes the painter is deprived of the most brilliant colours,—such as orpiment, chromate of lead, the lakes, cinnabar, and the greens made from copper.[2]

[1] *Cartone*, as the Italians spell it, means a large strong paper, or pasteboard, formerly much used by the artists for their first sketches or designs.

[2] Some of the greens, from preparations of copper, are still used in imitation of the ancient masters; the moderns also employ cinnabar.

The yellows employed are the ochres: Naples yellow may also be used. The ochres calcined produce the reds, not very brilliant for the draperies, but, mixed with white, they produce very true flesh tints. Cinnabar may be used, by steeping it for some days in lime water; it, however, loses some of its brilliancy, but still it is richer than the ochre reds, or the oxides of iron.

These oxides, which are of different degrees of oxidation, produce a variety of red tints, from orange to violet. The latter, made of the tritoxide of iron, is rather a dull tint, but it can be made brighter by mixing the Cassius purple with alumine, and calcining them like cobalt blue.[1]

The blue is the only brilliant colour in fresco: the ancient painters were not acquainted with either the cobalt or ultramarine of the modern frescos. They were confined to a blue preparation from copper, of which Vitruvius has described the mode of manufacture.[2]

The greens were composed of terra verte of Verona, and some preparations from copper. The green oxide of chrome appears to have been in use.

[1] See the article on the violet colours.

[2] See the article on Egyptian blue.

Of blacks, the variety was abundant: the black earth commonly known as our "soft black chalk" was very much used, and the charcoal blacks were employed with equal advantage. The lamp black is the most intense, and also the most permanent of this class.

For the whites they used chalk and lime, to which were restored the carbonic acid which they had lost in their calcination. This white, which is styled *San Giovanni* by Cennino, and without which, he assures us, it would be impossible to produce any fine tints, is prepared in the following manner:—

Some very white lime is put into an earthen vessel, and covered from the air; it is then washed in a good quantity of water, and when it has subsided in the bottom of the vessel, the water is poured off, and renewed several times during about eight days; afterwards the deposit is ground, and formed into shapes, which are dried in the air: the longer they are exposed to this action the finer will be the tone of the white.

This long operation can be made, however, with more quickness. The exposure of the substance to the air is for the purpose of restoring to it the carbonic acid lost in its calcination, but that restitu-

tion can be effected in a few moments, either by passing through the lime wash a current of carbonic acid gas, or in moistening it with a sufficient quantity of water saturated with this acid.

The article "Fresco," in the Encyclopædia,[1] informs us, that the colours used in fresco painting are only to be tempered with pure water; but that is not the fact exclusively, for a sizy substance is added in the mixing and applying those colours which, like blue, are so arid that they would separate quickly from plain water. With only this liquid it would not be possible to lay a good ground, or lay on the colours in a good smooth body. Cennini always points out the colours which are used with water without gelatinous aid. In speaking of the white called *San Giovanni*, he particularly states that it is used without size; and of the charcoal black he says, that it requires the addition of size in fresco, as well as in distemper painting.

It was thought that an argillaceous earth, such as terra verte, the red and yellow ochres, which retain water a long time, need not be combined with any viscous substance; but all the colours

[1] That article is abridged from P. Pozzo's work.

which, like sand, do not retain water, cannot be worked readily without a portion of gelatine to preserve them in a liquid state.

The size which Cennini recommends for this purpose is a mixture of the whites and yolks of eggs when well beaten up together. It is only the albumen that can be employed, or the serum of the blood, which is a similar substance, or even the blood itself, for the brown colours. Any of these substances form, with the lime, a size that, when dry, is insoluble.

Some painters mix a little milk with those colours which they require to remain in a soft state: the *causeum* of the milk forms, with the lime, a size that, when dry, is also insoluble; but it would be better to prepare the size from cheese, prepared in the proper manner.[1]

Azure, ultramarine, and black, are the only colours which it is recommended to use with size. It would, in fact, be a better plan, to direct that all colours which do not unite well with water should be tempered with size. This addition will also render the execution of the work more easy, with-

[1] See the article on causeum, page 217.

out diminishing its solidity, since we know that the vehicles used become, when dry, insoluble.

Having, at the commencement of this article, stated a hope that I should be enabled to demonstrate, that the superiority of some frescos, in their colouring, is owing to the process by which these colours are applied, it is on the authority of Cennini that I support my demonstration. After he has given directions for preparing a head, by commencing with the shadows, and then the half tints and lights in succession, he adds :—

"There are some painters who, when they have thus prepared a head, take a little of the *San Giovanni* white, diluted with pure water, and give with it a few touches, to mark the relief of the most prominent points of the lights; they next applied a rosey hue to the lips and cheeks; after this they passed over it all a wash of *acquarelle*, (flesh colour,) very liquid, and the head was then coloured, nothing more being requisite than to give some touches of white upon the high lights; this is a good method. Others apply, at first, to the face a general tint of flesh colour, and afterwards put in their shadows with a mixture of that colour, and of green brown, *(verdaccio,)* and finish with a few touches of flesh

colour. This method is that of persons not acquainted with the resources of their art."[1]

Nothing can be clearer than this description of glazing, which produced tints very different from those used by the paste method, and much more brilliant. These glazings should be the last thing done, after all the painting has been finished in the solid opaque vehicle. The first couches of colour, laid on the fresh mortar, are absorbed, but, after some hours' work, when the picture becomes saturated, the water, which rendered the colour manageable, also becomes absorbed, and fresh couches of colour do not unite with the preceding ones, and the artist must confine himself to operating with coloured waters.

The cracks which we find in some of the frescos by Raffael, Dominichino, and others, are the actual glazings, which united to the colours beneath,

[1] Alcuni maestri sono che, stando il viso in quella forma, tolgono un poco de bianco sangiovanni stemprato con acqua è vanno cercando le somità e relievi del detto volto bene per ordine: poi danno una rosetta ne' labri e nelle gotte cottale meluzina: poi vanno sopra con un poco *d'acquarella*, cioè incarnazione, *bene liquida* e rimane colorito. Toccando poi sopra i rilievi, ed è buon modo. Alcuno campeggia il volto è incarnazione prima; poi vanno ritrovando con un poco di verdaccio è incarnazione è rimane fatto. Questo è un modo di quelli che sanno poco dell' arte.

from their not being laid on in a sufficiently full body.[1]

The application of this glazing requires some caution to keep it from rubbing up, or attacking the colour beneath; and *Cennini* advises the use of brushes of a fine grain, the points of which are very soft. Besides, this glazing should not be attempted until the colour to be gone over has become quite firm by the absorption of the greater portion of water it contained when laid on.

I am convinced, that to the employment of glazing we must attribute the remarkable difference that exists between the ancient frescos and those of our days. It has been objected to some of the latter, that they resemble paintings in body colours; but, in fact, there cannot be any difference in the appearance of these two species of painting: if the colours employed in each are tempered with paste, they must be equally opaque.

I do not think it necessary to state the precautions which are to be taken in the management of the work, that the terminations of the parts, as they proceed, may not interfere with the execution of the other

[1] The effects of the glazings may be seen in the valuable fragment of a painting by *Luini*, which is in the collection of Count *Sommariva*.

parts. Neither is there occasion to say any thing more relative to the method of preparing the tints, and proving their fitness for the work. Even supposing that I had, for that purpose, entered into the most minute details, yet this would not make up for the want of experience, which no theories can supply, and which can only be acquired by great practice. And I am quite convinced, that those who never have painted in fresco, or, at least, who have not seen practically the operation of painting in that style, never will succeed on their first attempt in this species of painting.

SOME

ORIGINAL OBSERVATIONS

UPON

THE RISE AND PROGRESS OF THE FINE ARTS IN ENGLAND,

AND THE

METHODS EMPLOYED IN PAINTING,

FROM

THE EARLIEST AUTHENTIC EVIDENCES OF THEIR EXISTENCE TO THE PRESENT TIME.

WITH

THE ENGLISH CHROMATIC SCALE, AND THE PRINCIPLES OF HARMONY IN COLOURING.

INTRODUCTION.

THE ingenious and intelligent Author of the preceding chapters, having incidentally, but with great candour and propriety, pointed out the principal causes, which have hitherto prevented the French School of painting from attaining that high character in the arts, which it is quite possible the genius of the French people might attain, had the sound and rational principles of art been introduced into their country, at the commencement of their School of Painting; it appeared to me, that a sketch of the origin and progress of the fine arts amongst ourselves, showing the difficulties and discouragements which for some centuries opposed the advance of English

art, would not only be interesting to most of our readers, but might be made to convey useful instruction to the junior aspirants for pictorial fame, as well as to place the entire case in a compendious, but clear manner before the British public, and to point out the modes by which the arts which adorn high civilization were carried to the utmost elevation of which, perhaps, they are capable, in States, not at all remarkable either for great wealth or extent of territorial dominion.

Having formed this idea in my mind, I sought the opinions of some friends, gentlemen whose judgment in such matters is, like their affection for the Arts, of the highest order. In every instance of my application, the opinion given was favourable to the plan; and having already collected much information upon this interesting subject, the following sketch is now respectfully offered to the public.

W. B. Sarsfield Taylor.

CHAPTER I.

ORIGINAL OBSERVATIONS ON THE ENGLISH SCHOOL OF PAINTING.

ALL persons who are well acquainted with the earlier history of pictorial art in England, must be sufficiently aware of the very slow progress which it had made in this country, even at an epoch when the great continental schools of art had gradually attained nearly to their meridian splendour. To those who may be unacquainted with the facts, it will appear scarcely credible, that during the memorable period which the people of Italy have proudly termed *il cinque cento*, which extended from the middle of the fifteenth to nearly the end of the sixteenth century, the art of painting was scarcely known in England, and had not obtained many marks of favour from any portion of society.

During this time, and even previously to it, the art

of painting had attained in Germany and the Low Countries a considerable degree of eminence; and we find that the artists and their works were looked upon with great favour by both princes and people. The discovery of oil painting, for instance, had been generally attributed, as we have seen, to the brothers Van Eyck, so early as A.D. 1410; and about seventy years afterwards, the celebrated German artist, Albert Durer, painted pictures of great merit, which we still admire for the tone of colour, correct drawing, and naturalness of expression; and which Mr. Fuseli has declared, were, in his opinion, "far in advance of that age," and moreover, "that in his easel pictures the colouring as far excelled the oil colouring of Raffael, as the latter excelled Albert in the higher qualities of the art."

It is true, however, that we find, in the collections of our antiquarian writers, some accounts of the works which Henry III. caused to be executed at his palace in Westminster, in architecture, painting, and sculpture (1216—1262). Amongst these he ordered the history of the crusades to be painted at the Tower, and "on the walls of the Antioch chamber," believed by some to be that now called the painted chamber. In the Jerusalem chamber there is still a full-length por-

trait of Richard II., and from the mention made of it centuries back, it is believed to have been painted from that monarch. There was, and perhaps still is, another portrait of the same prince at Hampton Court Palace, with one of Henry IV.; and there is another very curious portrait of Richard II. at Wilton, in which the king is represented with his crown on his head, and all the insignia of royalty about him. This picture was, until lately, firmly believed to be painted in oil colours, but I have it from unquestionable authority, that such is not the fact: it is painted, as the portraits of that day were, in water colours prepared with size, or what are now denominated "body colours," laid on, with a full pencil, upon a gold ground, and then highly varnished with hard varnish. The drawing is good for that age: it is marked at the back 1377, the year in which this sovereign commenced his reign. The ornaments are carefully painted, and the gold ground is left in some places, to aid their effect.

This picture has been brought forward as one of the evidences in support of an opinion that has existed for more than a century, namely, that painting in oil was known in this country previous to the time the Van Eycks are said to have discovered or invented that process; but it appears

certain that this picture is painted in sized colours, and coated with hard varnish.[1]

[1] There are some other specimens in the Abbey of Westminster; one of these is an altar-piece in St. Blaise's Chapel, representing that saint, to whom a priest on his knees is offering up prayers: this is painted on the clean surface of the stone wall, and the colours are tolerably well preserved; there are also the whole length figures of Edward the Confessor and Sibert in the Abbey; and in the Office of Records, which was the Chapter House of the Abbey, there are two pictures, single figures, still quite visible, but not together, they are females, the heads not ill drawn; the character of each is mild; they are painted evidently on a gold ground, which is left uncovered to form a glory round each head; the golden surface is still bright, and the draperies and outlines are still quite distinct; the faces do not appear to have suffered from damp at all, or the scaling of the colour; they are evidently painted upon the plain stone face of the wall, without any underlay of artificial preparation.

In the same way were the walls of the splendid Royal Chapel of St. Stephen's painted, with divers histories, mostly scriptural. Amongst others was the Transfiguration, under the great west window; the altar-piece at the east end, represented the Adoration of the Shepherds and the wise men offering; the miracles of the Apostles, &c. &c. In fact it was quite a splendid picture gallery of scriptural history. And, it is most worthy of remark, that all those subjects, and likewise the single figures of Kings, Queens, and Saints, were painted on a ground of red lead and oil, which was laid on the plain surface of the wall: this was of purbeck marble, tooled very fine, but not polished. Mr. Adam Lee, who was many years clerk of the works here, under the Board of works, and is still in that capacity to the Horse Guards, &c., had a great number of them copied, with the whole of the architectural arrangements in this splendid chapel, the painted Chamber, the old House of Lords, in which was a large picture of John signing Magna Charta, and the other Chambers. Mr. Lee also had the whole arranged in large drawings in perspective,

In what material the apostles were painted, which Edward of Westminster was ordered, by writ the 34th of Henry III. to paint on the walls of St. Stephen's Chapel, we have no information,[1] and

and exhibited; the effect was the most complete optical delusion that could be, for looking through the lens, the pictures appeared quite like realities. Mr. Lee has them still at his house in New Palace-yard.

In Smith's antiquities of Westminster, that author states his opinion positively as to the pictures being painted in oil and varnish, for he had the colours analyzed, and found that they were all mineral colours, but no animal gluten mixed with them. The above Chapel was eighteen years building, and was finished by Edward III., 1348.

The late Sir John Soane, and Mr. L. N. Cottingham, also examined some of the apartments of the ancient Palace twenty years ago, and saw many ancient paintings on the walls, which they were strongly of opinion must have been painted with oils and varnishes. Mr. Lee has also four very ancient pictures on panel (I think walnut): one is a Seraphim; the others are the Prophets Isaiah, Jeremiah, and Jonah. They are firmly painted, and adhere strongly to their ground; the colours are still good though not bright, and are unimpaired, except where lime wash has gone over the edges of the panels; the vehicle in which they are laid, is probably a mixture of oil and hard varnish, if not, it would be desirable to know what it can be.

[1] Close Rolls, Walpole, Vol. I., 23, Hen. III. "The King to his treasurer and chamberlain:—pay from our treasures to Odo the Goldsmith, and Edward his Son, one hundred and seventeen shillings, and ten pence, for oil, varnish, and colours bought by them, and for pictures made in the Queen's chamber at Westminster, to the octave of the Holy Trinity, (May 25,) in the 23rd year of our reign, to the feast of St. Barnabas, (June 11,) in the same year, namely, for fifteen days."

unfortunately they have long been destroyed by fire.

In Walpole's anecdotes of painting, &c. mention is made of some other specimens, one of which is on panel, and was an altar piece at Sheen. It is in oil, and represents Henry V., his queen, attendants, &c., and St. George combating in the air with a terrible looking dragon. This piece is in oil, but he believes it to have been painted in the reign of Henry VI. or VII.

In Henry the Sixth's reign (1377—1399) there is a less barren prospect of the arts before us. There are several portraits of this monarch at the old palaces, King's College Chapel, and other places. But heraldry painting seems to have been the only sort in demand, and it was chiefly confined to the use of the nobility, for the purposes of vanity or devotion. Missals, armorial bearings, the windows of churches, and the images of their saints, were the only objects that then employed the industry of the painter. Even portraits were not in fashion except with the blood royal.

Under Edward IV. (1461—1483) we find but few traces of the arts. This king's picture was at Kensington, (now at Hampton Court); another is at St. James's, and that of his queen at the Ash-

molean Museum, Oxford, and Queen's College, Cambridge.

There is also another portrait of this reign at Eton: it is a likeness of the celebrated but unfortunate "Jane Shore." It certainly does not satisfy the ideas we have of her personal attractions, but possibly art has more to do than nature had, in this disappointment.

At this period, "the wars of the roses," and other political struggles, produced their usual fatal influence in repelling the natural progress of the national intellect in the useful as well as in the elegant arts.

Henry VII. (1485—1509) was too much of an economist to give much attention to this branch of art, though there are two or three portraits of him at the royal palaces. Walpole says of this penurious king,—"That he never laid out any money so willingly as on that he could not enjoy,—*his tomb*; but he was comforted probably with the thought that it would not be paid for until after his death. Being neither ostentatious nor liberal, genius had no favour with him: he reigned as an attorney would have reigned, and he would have preferred a conveyancer to Praxiteles."

On the Continent painting had attained nearly to

its highest splendour during this reign, in which period the first two painters are mentioned, viz. John de Mabeuse, from Hainault; the other was named Holbein—not Hans—who lived and died at Wells, but little known. Mabeuse's pictures have merit, and are found in various collections.

Having traced the obscure, difficult, and barren path of the art of painting, for a space of one hundred and eighty years, during which time it is clear that the art was barely kept alive; we now come to a period, from whence may be dated the second appearance of modern art in England: although there are evidences in some of our really fine gothic edifices, both ecclesiastical and baronial,—as already stated at page 296,—of ornamental paintings on the walls and the windows, in which the subjects are taken from scripture history; and these paintings often display correctness of expression, and propriety of action, though generally hard in the outline, and not showing much skill in the mechanism of art.

It is therefore with the reign of Henry VIII., (1509—1547) that the first establishment of painting took place in England. This monarch, whom his father's parsimony had left with great wealth, seems to have had, in his earlier stage of monarchy,

a taste for what was grand and liberal. He soon found at his court, Hans Holbein, Sir Antonio More, and Zucchero; and he invited Raffael, Titian, and other great artists to England; the three former were treated with great attention and liberality by the King,[1] but the latter excused themselves, on

[1] One incident will explain sufficiently the decided partiality which this king felt for the fine arts, whilst it conveys to our minds a picture of the rough state of manners at that time, proving also what a different class of persons our present race of nobility is composed of, as compared with those of that age.

There are two or three versions of this fact, as there are of every fact with which I am acquainted. These, however, do not differ materially in the principal points. It appears that Holbein was engaged on a day painting a portrait of one of the queen's ladies in his studio, in the palace, when a nobleman, who wished to see how he painted, came to his door, and would not take any denial from the serjeant; but was about to force his way into Holbein's apartment. The latter came to see what was going on; and the Lord then attempted to push into the room, which Holbein resisted, and in the scuffle his Lordship was tumbled down the stairs and hurt. The painter, on seeing this mishap, was equally prompt in conceiving what his next step should be; he retired and made his way privately to the king, whose pardon he craved; and the king acceded to his prayer, provided he told him the truth: this Holbein did most correctly. In a few minutes more the noble antagonist of the artist was announced. He had come to demand that Holbein's head should be the forfeit for this insult to his dignity. Henry told him to give a true statement of the facts; in doing this, however, he suppressed a material one with which the king was acquainted, and his majesty merely told Holbein to ask the lord's pardon; but his lordship would not be satisfied with so trifling a punishment, but demanded the execution of the painter. This excited the king; who told him that, as he had suppressed a

account of the immense number and extent of their engagements in their own country, but he purchased some of their works, with which to adorn his palaces.

Henry had ample means, and a great love of splendour; his good feeling for the arts might, no doubt, have been founded more upon a love of barbaric grandeur, than upon the sound principles of good taste; and "the field of cloth of gold," amongst other gorgeous pageants, is given as the foremost amongst the proofs of the want of refinement in the King—it might be more just, perhaps, to say, "the age" in which he lived. But, however that may be decided, it is quite evident, that when a monarch has magnificent ideas, whether directed by good taste or not, and with sufficient opulence

fact, he, in consequence, was not entitled to any satisfaction, and said, "My lord, you have not now to do with Holbein, but with me. Whatever punishment you may contrive against him by way of revenge, shall most assuredly be inflicted on yourself. And remember, that I can, whenever I please, make seven lords of seven ploughmen, but I cannot make one Holbein out of seven lords."

Holbein appears to have continued in favour at court during the remainder of Henry's reign, which lasted many years after this incident. He was also employed by young Edward, and finally died of the plague in London, in 1554,—the year of Queen Mary's accession. He must have been, at that time, according to Charles Paten's reckoning, in the fifty-ninth year of his age.

to carry his ideas into practice; man's ingenuity and industry are called into active service, consequently much good must arise to society; and, as the Hon. Horace Walpole, justly and wittily remarks,—"on such occasions, even *merit* stands a chance of getting bread." Besides the artists already mentioned, Henry had in his service John of Treviso, Totto, Penni, and Hombard of Ghent. Some of the works of these artists are still at Hampton Court.

Holbein had an apartment assigned him in the Palace, by the King, with a pension of two hundred florins per annum, besides being paid for the pictures which he painted for Henry. Holbein painted the great picture in the Surgeons' Hall, representing Henry VIII., granting to that society the charter of incorporation; also the large picture at Bridewell Hall, (Blackfriars,) of Edward VI., delivering the charter of its incorporation to Sir George Barnes, the lord mayor.

Holbein also painted in distemper colours, two very large pictures, one of "riches," the other of "poverty," at the Easterlings' hall, Steel-yard, Lower Thames Street; but the company having been suppressed for monopolizing the corn which

they imported, these pictures were carried to the continent.

A great number of Holbein's pictures are still to be met with in the best collections.

Torregiano was brought over from Florence, to complete the tomb of Henry VII., for which he received one thousand pounds. This great sculptor unfortunately left England, and went to Spain; he was at first well employed, but being suspected of opinions not according with those of the inquisition, he was thrown into prison, and either died naturally, or of starvation in one of their dungeons.

Sir Antonio More had one hundred pounds per quarter, as painter to the King and Queen. King's College Chapel was finished in this reign, and the three great windows were executed by London workmen.

During the reigns of Edward VI. (1547—1553) and Mary (1553—1558), the unsettled state of religious and political principles, were not favourable to the fine arts, although they appear to have taken root in the soil; and the artists under the late reign were still employed. One English artist appeared at this time, N. Lysard, of whose talents Hilliard speaks with much commendation, but laments that "he

was unfortunate, from being *English-born*, for otherwise, even the strangers (Phillip and the Spaniards) would have set him up." This miserable and unnatural prejudice against native talent, is very remarkable throughout the history of the arts in England, down to a very late period; some think that a small quantity of the leaven still remains amongst us: whether its dregs do or do not still exist in Britain, may be a matter of dispute; but that such a strange species of absurdity never did exist in any other country, is quite certain, as the historical records prove most abundantly.

Had the Protector, the magnificent Duke of Somerset, lived, it is probable, as Walpole says, that "he would have called in the assistance of the ablest artists, native and foreign, to adorn the palaces and public buildings, with works that are the noblest furniture."

John of Padua, a celebrated architect, was brought over at this time.

Under Elizabeth (1558—1603) the arts continued to make some progress; and amongst many foreign painters, such as De Heere, Ketel, T. Zucchero, Vroom, De Critz, &c., we find two or three natives of talent; one of these was Sir Nathaniel

Bacon, younger son of the Lord keeper, James Oliver, and N. Holland.

James I., (1603—1625,) perhaps fortunately, did not meddle with the arts, as he might have done them no more service, than he did to literature. They, however, got on quietly in the hands of foreigners, such as Vansomer, Cornelius Jansen, D. Myttens. But Peter Oliver and Gyles were natives, who got some employment.

From the foregoing facts, it may be inferred that, although an absurd and groundless prejudice, combined with the general state of the kingdom's affairs, was not favourable to the development of English pictorial talent; yet it had been for some time in a state of active, but very subordinate existence, silently practising the rules and processes of the good continental schools.

Charles I. (1625—1653) was the first English monarch whose example and encouragement created an era of real taste for the fine arts in Britain.

This monarch had a very strong native taste for paintings, and his affection for works of high art prompted him, not only to purchase a great number of valuable pictures, but also to invite to his court, such artists as Titian, Rubens, and Van-

d. 1576!

dyke. It appears that the King intended to establish a permanent school of arts in England, being well aware of the advantages that the arts always confer on nations, where they are duly protected and encouraged.

The civil war, and its calamitous consequences however, soon scared the elegant and peaceful arts from their propriety, and nearly extirpated them from the soil of England, by the dispersion of the artists, and of the splendid selection of paintings, and other works of elevated art. These the elegant and cultivated taste of the monarch had caused to be collected at a great expense, not merely for his own gratification, but with the still more rational purpose of creating a taste for such works, amongst the nobles and the wealthy men of the land; justly considering the cultivation of the arts as being amongst the best means of conferring rational refinement upon a people, and indeed of which it is clear, from the best historical evidences of that day, the nation, with few exceptions, was strangely deficient.

The desolating wing of the worst species of Iconoclastic barbarity, having swept away from the shores of Britain these bright memorials of superior genius, intellectual cultivation, and munificent

patronage; long did the arts which adorn civilized society, remain comparatively unknown or disregarded; and so fatal was the degrading influence, caused by the dispersion of the superb collection of Charles I., that it was full half a century before confidence was in any degree restored, so as to make it not imprudent for Englishmen to make the arts their profession, although foreigners were always liberally rewarded, and so far the arts were still kept alive in England.

Besides the eminent men already mentioned, whom Charles had brought over and encouraged, there was a native artist (Dobbs,) whom Vandyke assisted to bring forward, and the King took him into his service, and employed him until his own affairs became desperate. After this, Dobbs, though an excellent painter, got no employment from the republican party, and died poor in St. Martin's Lane, A. D., 1646. Whilst Walker, whose being a native of England is doubtful, but whose inferiority of talent to that of Dobbs is not so, was patronized by Cromwell, and the leaders of the victorious party. Amongst the other painters in Charles's time, were Lely, Diepenbach, Geldorp, Polemberg, Honthorst, Gentilischi, Weesop, Wouters, Butler, (Hudibras,) Pettitot, Le Sœur, a sculptor, Inigo

Jones, Graham, Hayward, Hoskins and Cooper. The last five were all Englishmen of fine talents, but not much encouraged after the decease of their unfortunate patron.

Charles II. (1660—1685) may be said to have re-introduced the arts, but not good taste amongst his subjects; under his injudicious patronage, the fluttering, gaudy, and not very decorous style, into which the arts had fallen on the continent, was made fashionable in England; and through the profligacy, ignorance, and subserviency of the courtiers in that reign, and unquestionably by the meanest sycophancy on the part of those decorative painters, who followed Charles to England; the good germs of art, that had been planted in his father's reign, were nearly choked up and extinguished; and this happened whilst native artists of great merit were pining away their unhappy lives in obscurity and want.

Such empirics as Verrio, Parmentier, La Fosse, and other foreign decorators, took precedence, and revelled in the broad sunshine of royal favour, and consequently of court patronage. It perhaps would not be credited, were not the public documental proofs in existence, that this man Verrio, who was a Neapolitan adventurer; and, who at the present

day, would only rank in mechanic art, as a respectable sign painter and decorator, actually received *seven thousand pounds* of English money, for those fluttering and tawdry productions, which are still allowed to disgrace modern British taste, in the Halls of Windsor Castle, &c. And this enormous sum was but a small part of the riches which this pictorial charlatan, and his myrmidons, (whom he brought over to assist him,) received from the public treasury of England. The King also employed Lely, who was a clever foreign artist; Laroon, Vanderheyden, Boll, Vanzoon, Hoogstrater, Varelst, and other foreigners, and some of whom were clever, as for instance: the two W. Vanveldes, father and son, whom he invited from Holland, and appointed them his marine painters, at a salary of one hundred pounds a year each, besides paying them for their pictures.

Several names of English artists appear about this period, but they were not encouraged by the court; although some of these were men of considerable talents; for instance, Hoskins, Riley, Greenhill, Fuller, and Davenport.

James II., during his short reign, (1685 to 1689,) followed a similarly depressing course, with respect to English artists, who nevertheless, were

on the advance, both in number and merit. Amongst them are found the names of Wright, Ashfield, S. Cooper, Gibbon, &c., with a host of foreign painters, the best of whom were G. Netscher, P. Stoop, Soest, Largelliere, Wessing, &c.

William III., (1689 to 1702,) was not an encourager of the arts, either in foreign or native hands, with the exception of two only; Kneller, who was a German, and a much better courtier than he was a painter, and Vanbrugh. This architect, and Kneller, divided the court favour between them, to the almost total exclusion of native merit. And the vicious style of each in his vocation, both in this and Queen Ann's reign, corrupted the arts so much, that under George I., (1702 to 1727,) the fine arts appear to have reached their lowest ebb in Britain. The style which was fashionable at this period, was the reverse of that stately and stiff manner, which had prevailed a century or two antecedently; it was a loose, disorderly kind of painting, begun by Verrio and his school, and carried to its most perfect state of barbarous taste by Sir Godfrey Kneller; who, most unhappily for the arts, led the fashion in this corrupt and mannered style, and who was closely imitated by the

mechanical artists of that era; his careless manner, which frequently reaches not higher than daubing, was the admiration of the great vulgar of that day; and some painters, emulous of his fame, believed they had caught his style, when in fact, they had merely neglected drawing, probability, and finishing.

During this antipodean period of art, including the reign of George I., there flourished in England, Marco and Sebastian Ricci, Jervas, an imitator of Kneller, and Richardson, who painted draperies so fantastic, that they never could be made the proper dress of any tribe, age, or nation. These facts go far to prove how rapidly the arts degenerate when neglected. These intellectual pursuits require good encouragement to elicit the powers of genius; but there was nothing of the kind in these three last reigns. And when the Earl of Halifax (lord treasurer) used his influence to get Sir James Thornhill to paint the apartments at Hampton Court, &c., the Duke of Shrewsbury (lord chamberlain) was most desirous to give the work to Sebastian Ricci; but the Earl of Halifax said, *He would not pay the foreigner, when a native quite as capable could be found to do the business.* And this sentence is worthy of being remarked, as the

first burst of true patriotic feeling, with regard to the fine arts, that the Muse of English history had yet recorded; and this manly, as well as just, expression of sentiment, was the more precious still, because it appears to have been also the first bold and successful effort that was made, to break through the ponderous crust of unnatural prejudice, which had hitherto overlaid the energies of native talent, and which, at this juncture, had nearly obliterated the arts in England (A.D. 1700 to 1730).

It is, however, true that Sir Christopher Wren had been appointed, by King Charles II., in 1668, "Surveyor-General of Public Buildings;" which office was renewed to him by James II.. Having finished the splendid memorial of his talents, St. Paul's Cathedral, between 1675 and 1710, and several of the handsomest of the London churches, this distinguished native architect and accomplished gentleman, who had done so much honour to his country by his talents and probity, particularly whilst he held the office of Surveyor-General, &c., was dismissed (3d year of Geo. I.) without even a colourable pretext, in the eighty-sixth year of his age, and the fiftieth year of his public services, merely, as it appears, to make room for an obscure

intriguer of the name of Benson, whose memory has been rendered immortal as Pope's Dunciad,[1] and which memory he has, by his own acts, consigned to infamy.[2]

[1] "Our Midas sits lord chancellor (of plays!)
On poets' tombs, see Benson's titles writ,
And, lo! A. Phillips is preferred to wit."

Note in the Dunciad, book iii.—"W—m. Benson, surveyor of buildings to his Majesty King George I., he gave in a report to the Lords that their house, and the painted chamber adjoining, were in immediate danger of falling. Whereupon the lords met in committee to appoint some other place to sit in, while the house should be taken down. But it being proposed to cause some other builders first to inspect it, they found it in very good condition.

"The lords upon this were going upon an address to the king against Benson for such a misrepresentation; but the Earl of Sunderland, then secretary, gave them an assurance that his majesty would remove him, which was done accordingly. In favour of this man, the famous Sir Christopher Wren, who had been architect to the crown for above fifty years, who had built most of the churches in London, laid the first stone of St. Paul's, and lived to finish it, had been displaced from his employment at the age of near ninety years."

[2] The cause of this man's promotion was not publicly known at the time; but has since come to light. He married a German woman, who *had been* a favourite with a High Personage of that reign, *on condition* that he should be appointed to Wren's situation, for which, it is almost needless to add, that he possessed not the slightest qualification. The same royal influence got Benson returned M.P. for Poole in Dorsetshire, and he sat in the house three or four years for that borough. But on the discovery of his

It is, therefore, sufficiently evident, that the incident of Wren's appointment was a sort of episode, or rather accident, which was remedied as soon as possible by his dismissal,—to the disgrace of those by whom that great man was deprived of his official situation. We have seen that the real talents of native painters and architects were treated with particular neglect or insult during the reigns of George I. and his two immediate predecessors; but sculpture was even more discouraged than its sister arts.

Besides the artists already mentioned, were the following, who painted in England:—Closterman, Vander Meulan, Monamy, Hemskirk, Kerseboom, Van Huysum, Le Piper, Watteau, Schalken, Richter, a Swede, Vandiest, and Dahl. But most certainly, since the arts were first admired in Britain, this period (1710 to 1730) has produced fewer works deserving the attention of posterity than any previous portion of time equal to it in duration since Henry VIII.

In the reign of George II. (1727 to 1760) the

attempted extensive fraud upon the lords and the public purse, together with other delinquencies that came to light, he was expelled by an unanimous vote of the House of Commons.

arts began to resuscitate, and particularly architecture. The reason of this improvement is easily explained. Her majesty, Queen Caroline, was a munificent patroness of the fine arts, of which this amiable queen had considerable knowledge; her Royal influence and example called, if not into existence, at least into notice, by liberal encouragement, considerable talents in every branch of art.

It was at that auspicious epoch that the nobles of the land were the amiable but worthy rivals of the best practical architects of the age, as their works still testify. The Earls of Pembroke and Burlington came little, or perhaps not at all, behind Kent, Gibbs, and other eminent architects, whose works are the best arguments of their merit.

In painting, some foreign artists of distinction still received the encouragement which their talents deserved. The chief of these artists were, Carl, Venloo, Van-aker, Leoni, Amiconi, Zincke, Canaletti, Rysbrack, and Roubiliac.

But this judicious encouragement to foreign artists did not interfere unfavourably with the interests of the native talents in the arts, which had been gradually recovering from their accumulated misfortunes of cold neglect, and the corrupt ex-

amples of the empirical school of foreign painters, of whom Sir Godfrey Kneller was the head. When this artist and Dahl went off the field, Richardson, who had been the pupil of a clever native artist, Riley, and Jervis, took the lead as chief portrait painters of this country. This fact will show how far the arts had fallen in Britain, through neglect. Hudson was a pupil, and became son-in-law to Richardson. Hudson, though not a man of high pretensions, yet had original feeling; and repudiated the loose and flippant mannerism which his father-in-law, who was an imitator of Kneller, but not of nature, had taught him: Hudson adopted a style more agreeable to nature and good taste. It was under this artist that young Reynolds received his elementary instructions in painting. By this time Sir James Thornhill was no more (1745); Ramsay and Hogarth had risen into eminence as painters; Sir W. Chambers, in architecture; Romney, West, Gainsborough, Moser, Barret, and other artists, began to find that, though native painters, they were receiving encouragement. A.D. 1760, "The Incorporated Society of Artists" was formed; and the united pictorial efforts of the English artists was, for the first time, exhibited to the public by an exhibition in the great room belonging to the

Society of Arts, in the Strand; and it is from this era that the English school of painting can fairly be dated.[1]

The reign of George III. (1760) commenced very auspiciously for the advancement of the fine arts in England. A.D. 1768, this monarch embodied the principal artists by his own authority under the sign manual, by the style and title of "The Royal Academy of Painting, Sculpture, and Architecture." These facts being recent and consequently well known, are only inserted here for the purpose of showing that a term of seventy years is the longest period which can be assigned to the British school, from its commencement to the present year (1839); and it will readily be conceded by all persons who are well acquainted with the history of the arts, and progress of the various schools of painting on the Continent, that seventy years is a very limited period indeed, to allow for the growth of a school of arts in any country, even in those states where both the government and the people have been highly partial,

[1] The second exhibition was in a very large room in Spring Gardens, where it was held annually until the establishment of the Royal Academy in 1768.

and encouraging to the development of native talents.

George III. may justly therefore be styled "The Father of the Fine Arts in England." With him the love of art seems to have been inherent; there was nothing accidental about it; this monarch's efforts to raise the liberal arts to that honourable position to which their intellectual character entitles them,—were always intentional,—always premeditated; they were the offspring of judgment arising from reflection, and consequently a perfect conviction of the inestimable value of the arts to mankind, when properly encouraged, and cultivated with true zeal and sound discretion.

His Majesty, besides his native love of the arts, was, it is well known, an excellent historian; and, from this inexhaustible source, he derived additional and irrefragable arguments in favour of the view he had taken, and the advice he had received, on this important subject; and although he had to contend against the cold and narrow prejudices of some political advisers at first, yet he firmly pursued his enlightened course, and at length convinced even those who at first were opposed to this object, that a great commercial nation is bound to encourage the

fine arts, for the moral effect, as well as the intellectual dignity, they confer on society, and that they also assist in extending that very commerce from whence pecuniary wealth is extensively derived, but which, without the aid of the elegant and intellectual arts, would terminate in a vulgar display of barbarous, redundant, and fantastic finery, such as we now ridicule in the practices of wealthy but semi-barbarous people with whom we hold commercial but not intellectual intercourse.

The King, no doubt, was aware of the high estimation in which the arts were held by commercial cities and states in ancient times, as well as in Europe during the middle ages. The people of Rhodes were deeply engaged in commerce; yet the progress they made in the arts, especially in sculpture, is truly astonishing. The Eginetans were likewise a commercial, but they were also an elegant people; and the beautiful sculptured marbles, some of which we now possess, that have been taken from the ruins of their temples, prove the fine taste of those islanders, and the high degree of improvement to which they had attained in sculpture and architecture. Argos, Athens, Sicyon, and Corinth, the seats of transcendent good taste, were more or less

commercial; as were, in fact, all the cities of the Ægean sea, and of the Cyclades.

Shall Pisa, Florence, and Lucca, be mentioned, or the other greater commercial states of Italy, Venice, and Genoa, or Holland and Flanders, to remind our readers of the unfading glory which commerce has derived from its munificent protection of the arts, that adorn civilized society, that mend the manners, and improve the heart? With all those matters, and abundance more, was George III. well acquainted; and so, no doubt, are the great majority of our readers. But it doubtless was this valuable information which, aiding his natural affection for the arts, determined the king to give every assistance within his command, to aid them in rivalling those of any other nation, ancient or modern. But the monarch knew, that to be successful, this object would require a very long time, and great encouragement from public, as well as from private sources. He could not do all that he wished to effect this great object, but he made a decided commencement; and the royal example was gracefully followed by the nobles and wealthier classes of the land. The kind intentions of the royal patron were in a good measure fulfilled during his life time, and the personal friendly intercourse

he held with the leading artists[1] produced a powerful moral effect upon the public mind, and on the character of the profession in England.[2]

The momentum which the arts had thus happily received has continued, and probably increased, through the decided patronage of King George IV., who was as anxious for their prosperity as his royal parent had been. When Prince Regent, he encouraged the acquisition of rare and valuable works of classic art. It was during this period that the Parthenon marbles, those inimitable and matchless remains, produced in the halcyon days of Grecian sculpture, were brought to England.

In 1824 the National Gallery of Pictures was commenced, by the purchase of the fine collection made by J. Julius Angerstein, Esq. This circumstance marks quite a new era of art in Britain.

[1] Particularly the presidents, Sir Joshua Reynolds, Benjamin West, and also Sir William Beechey, with each of whom this monarch was in the habit of holding familiar conversations on all subjects connected with the arts, and conducive to their prosperous advancement.

[2] The Royal British Institution was founded in 1805, and opened in January, 1806. Its exhibitions, and the sales effected there of the works of living artists, chiefly purchased by members of the Institution, have been of considerable benefit to the arts, in bringing forward young men of talent, who otherwise might have remained in unmerited obscurity.

George IV. had magnificent ideas relative to the arts; but coming into power late in life, and being annoyed by factious and domestic embarrassments, his good intentions for promoting art were unavoidably neutralized.

"The Society of British Artists" (in Suffolk Street) was also established in this reign, and its exhibitions have brought forward many artists of talent, and even of high reputation.

King William IV. having been bred up in the naval service, to which many years of his life were devoted, did not therefore possess the same knowledge of the arts as the two preceding monarchs; but he was always kind to the professors, and took a great interest in the affairs of the Royal Academy, the yearly accounts of which society he always examined himself, with great attention; and it must not be forgotten, that the last public place which this kind-hearted monarch visited, was to open the new gallery of the Royal Academy at Trafalgar Square, May, 1837. The king was ill then, but would not disappoint the hopes of the lovers of art and the members of that institution; yet in six weeks afterwards William IV. was no more.

The commencement of her majesty Queen Vic-

toria's reign (June, 1837) appears to dawn auspiciously on the fine arts. Her Majesty visits the Royal Academy at its opening, and graciously permits her portrait to be taken by painters and sculptors of acknowledged high talents.[1] Her Majesty is said to be fond of painting, and has been well instructed in its principles and practice by eminent artists.

Having brought this rapid but careful outline of the origin and progress of the arts in Britain to a close, and having stated some of the important facts relevant to that subject, I feel a hope, that the evidence now brought forward will be sufficient to convince those of their error who may yet be sceptical enough to imagine that either the soil, climate, or intellect of Britain, are not capable of producing great works in the highest classes of art. My object is to show, that the fine arts in this country have never had fair play until within the last seventy years. It has been shown, from

[1] Her most gracious Majesty has had her portrait painted in Sir D. Wilkie's historical picture of "The Queen in Council;" also by E. A. Chalon, R.A. W. Wyon, R.A., medallist, has executed some beautiful medallions of the Queen; and Sir Francis Chantrey, R.A., is now engaged in modelling a splendid bust of her Majesty.

authentic records, that our *native talent* in the arts was not only unaided, but neglected and despised, with one or two exceptions, until about the commencement of the period mentioned. To expect, therefore, that the genius of the country should develop itself under circumstances so cruelly adverse to the expansion of intellectual power, would be about as reasonable as to expect that grapes, figs, and melons should grow and ripen unsheltered in our climate at Christmas.

It is well known to most of our readers, that one of the grandest principles in physical science is, "That there cannot be any effect without an adequate cause;" and yet, with respect to the arts, it does appear, as if this universal principle was not to be applied in England. And therefore it is that we meet with persons now and then who dogmatically assert, that "the arts have not made any thing like the progress in this country which they ought to have done."

These gentlemen would do well, in the first place, to make themselves thoroughly acquainted with the history of the arts in Italy, and in the other countries on the Continent where they have arrived at pre-eminence, and then read the history of the arts in their own country; and if they do not

abandon their first notions, they must be lamentably obstinate in error.[1]

The last seventy years, therefore, we think, may rightly be considered the age of the British school, and for that limited space of time there is no other school can show greater, or perhaps so great an improvement. In Italy, with its fine climate, and enormous public encouragement, as well as private patronage, it required full two centuries and a half[2] to bring these arts up to their meridian splendour. Therefore, to make the cases of the foreign and native schools parallel, and to try the British intellect fairly to the utmost, it is clear that the same sort of encouragement should be applied, otherwise the argument is good for nothing. But, on the other hand, perhaps it would be difficult to prove, that under similarly discouraging circumstances, the continental schools would not have been altogether obliterated.

So far, however, as private patronage is concerned, there certainly is, and has been for some years, a great deal of encouragement bestowed upon our native

[1] Possibly there may be some persons in this class of opinionists to whom the following invocation of Count Strogonoff may be applicable:—"*Grand Dieu, delivre nous de ces amateurs sans amour, et de ces connoisseurs sans connoissance!*"

[2] Cimabue commenced about 1260, and in 1520 Da Vinci and Raffael both died,—the first at Paris, the second at Rome.

artists; and in the same proportion have been their exertions to deserve success; and works of fancy and portraiture are exhibited now, superior to any that could be produced forty years since, with the exception of Reynold's works. This arises from the superior knowledge of principles, and the practice founded on these principles, which have become very generally known in the British school. It is not, therefore, in these walks of art that encouragement is so much wanted, but in the more lofty and intellectual classes of historical and poetical composition. Here it must be confessed there is no public encouragement, such as we see in France, Germany, and the Low Countries. And until our government, and the wealthy public bodies, offer to purchase great works of art, it cannot be supposed that artists should run the greatest risk possible of starvation whilst employed in the production of such noble works,[1] for which, when completed, they would not find a purchaser. Surely to expect such sacrifices of, or from, British artists, is more than sound reasoning

[1] James Barry's fate has had a most chilling effect on British pictorial art. His great genius was far in advance of the age in which he lived; and though he had a sufficient pittance to exist upon, yet neglect and harsh treatment drove him into a confirmed state of misanthropy, if not monomania.

would expect; and is certainly far beyond what has ever been expected from the artists of any other country. It has been said, as I understand, by some gentlemen, "that if the talent existed in the nation, great works of art would be produced, and then purchasers would be found for them." Now, without attempting to impugn the right of free opinion, which these gentlemen possess, this assertion does appear to be one of the most extraordinary paradoxes that perhaps has yet appeared in this paradoxical age. Indeed it is too broad in its way to do any great mischief to the arts; it is another form of that pseudo-philosophy, which sometimes mistakes causes for effects, and at other intervals expects effects without causes. But if these gentlemen will be so kind as to inform the artists of Britain, in what age or country they are to find examples of that species of speculation, perhaps it would induce those of the higher grade in art with us to try the experiment. But until satisfactory proof be given that this was the practice of the great men of the foreign schools, it is to be hoped that the common good sense of our artists will restrain them from a course of action, which is opposed to all the sound principles of political, social, and intellectual economy. "The demand is the cause,"

"the supply is the effect;" and people of sound understanding, in all the intercourses of life, take care that the effect shall not precede the cause. The great cathedrals and other public edifices of Italy, Spain, &c., were built without any thought about the painters, and then the latter were called in to adorn them with their splendid works of art. If the Sistine chapel and the Vatican had not been built, neither Raffael nor Michael Angelo would be looked upon with that high degree of admiration to which those great memorials of their genius give them so just a title.[1]

Having shown that the strange prejudice, which for so long a period had retarded the advancement in the arts in England, has been gradually wearing away for the last seventy or eighty years, and that in the same proportion native talents, in every branch of the arts, have developed themselves in a manner highly flattering to the character of the nation, so far, at least, as fair encouragement has been bestowed upon them, we cannot help thinking that so

[1] "Those great artists were not employed because they *had produced* great works, but they produced great works *because they were employed to produce them.* Their fame rests upon exploits of art, which true patronage inspired them to conceive, encouraged them to undertake, and enabled them to accomplish."—*Letter of Sir M. A. Shee to Lord J. Russell.*

far the artists and the enlightened portion of the public have done their duty, and to that extent have rescued their country from the opprobrium of not possessing native taste, intellect, or feeling, either to produce works of art, or to reward our artists.

One great object, therefore, has been gained; and the impertinent sneers of the Abbès Winklemann, du Bos, and other continental writers, at our Bœotian heaviness, have lost their power, but not their malignity. It is said that a person named Waagen has lately been indulging himself in some witticisms equally ridiculous with those of the great literary pioneers, his precursors.

"For *leaden* dullness ever loves *its* joke."

It is much to be regretted, however, that men of literature connected with the public press in England, do not generally take up the side of the men of art, and give their powerful aid to protect and encourage the once oppressed but rising arts of their country. In this respect the continental artists have a great advantage over those of Britain: the former have a cordial feeling towards each other, which strengthens both, and injures neither. And whilst a German, or a French critic, is dwelling with satisfaction upon the merits of a

middling picture or piece of sculpture by a *compatriote*, the English critic often treats with harshness, the best works of his countrymen.[1] This is a thing to be deplored, because it is discouraging, always unkind, and sometimes unjust. These arts cannot retaliate, and therefore manly feeling should be exercised towards them, and forbearance substituted for severity, except where presumptuous ignorance obtrudes its brazen offspring into the proper station of modest merit. Yet it is to be hoped that these gentlemen of literary talents will look with cordial feeling upon the productions of the arts, and not intentionally injure the prospects, or wound the feelings of men, who, in the pursuit of their elegant vocation, have many vexations to encounter of which the world cannot be aware.

SECTION II.

METHODS OF PAINTING USED IN THE ENGLISH SCHOOL.

I HAVE already stated, that the principal artists who came to England from the Low Countries

[1] These remarks are only meant to apply to a certain class of criticisms on the annual exhibitions.

were possessed of a good knowledge of the principles of art, and also of the proper materials and the methods of applying them. It is not improbable that this knowledge may have come down traditionally amongst the few native painters who followed each other to the time of Hudson, for it is evident, that so far as his process and materials went, his works in general stand very well.

But this did not satisfy the ardent and inquisitive mind of young Reynolds: he would, and did think and examine for himself. The result was, that splendid breadth of effect, mellowness of tone, and harmony of colouring, which justly placed him at the head of the colourists of his age.

The infant British School of Painting adopted his methods, and have produced works, which, for effect, colour, and tone, are not surpassed, perhaps not equalled, in Europe at the present day, and would be admired for these qualities in an age when colour and effect were in their highest state of estimation.

The following extract from Mr. Northcote's book will convey the best ideas that can be obtained on this subject. These notes appear to have been written at Rome by Sir Joshua, to direct him in his future practice.

"The Leda, in the Colonna palace, by Correggio, is dead-coloured white and black, with ultramarine in the shadows; and over that is scumbled, thinly and smooth, a warmer tint,—I believe caput mortuum. The lights are mellow; the shadows blueish, but mellow. The picture is painted on a panel, in a broad and large manner, but finished like enamel: the shadows harmonize, and are lost in the ground.

"The Ecce Homo of Correggio in the same palace. The shadows are entirely lost in the ground,—perhaps more by time than they were at first.

"The Adonis of Titian in the Colonna Palace is dead-coloured white, with the muscles marked bold. The second painting he scumbled a light colour over it; the light, a mellow flesh colour; the shadows, in the lighter parts, of a faint purple hue—at least they were so at first. That purple hue seems to be occasioned by blackish shadows under,[1] and the colour scumbled over them.

"I copied the Titian in the Colonna collection

[1] Probably a dark ground, which Titian frequently employed, and which, in showing itself through a white preparation, as stated, would take the tint alluded to. Such a ground is afterwards mentioned as having been employed by G. Poussin.

with white umber, minio, cinnabar, black; the shadows thin of colour. Perhaps little more than the dark ground left.

"In respect to painting the flesh tints, after it has been finished with very strong colours, such as ultramarine and carmine, pass white over it, very thin with oil. I believe it will have a very wonderful effect.

"Or paint carnation *too red*, and then scumble over it with white and black.

"Then dead colour, with white and black only; at the second sitting carnation, (to wit the Barocci at the Palace Albani, and Correggio in the Pamphili.[1]

[1] "All these modes of preparation were afterwards employed by Sir Joshua, who generally made out his shapes, as well as the light and shadow of his heads, in little more than blue black and white, or lake blue black and white (sometimes lake and white only), using always, in this stage of the picture, a good body of colour; over this, when dry, he scumbled yellow ochre and white, or umber and white, sometimes *orpiment* and white, very thin; and on that retouched his features, and tinted the cheeks and other parts of the head which might require it, with brighter and more decided colour: a slight glaze, little more than the varnish, completed his work.

"Sometimes, instead of scumbling, he employed glazing with red lead or vermilion, which, being passed thinly over his white preparation, gave considerable power to the local colour of his head; on this he painted thinly with ultramarine and white, and *orpiment*, or yellow ochre, and white, tinting in parts with carmine, and finishing with a thin glaze of asphaltum.

"Poussin's landscapes in the Verossi Palace, are painted on a dark ground, made of Indian red and black.

"Make a finished sketch of every portrait you intend to paint, and by the help of that, dispose your living model; then finish at the first time, on a ground made of Indian red and black.

"All the shadows in the works of the Carracci, Guerchino, as well as the Venetian school, are made with little colour, but much oil: the Venetians seem to be made only of a drying oil, composed of red lead and oil.

"Occasionally he allowed his first glaze to dry, and then painted thinly over it, with *orpiment* and white, ultramarine and white, and vermilion or carmine and white; but always allowing the colour underneath to appear more or less through whatever he passed over it.

"In very many of his pictures, which have been injudiciously cleansed, the first preparation is all that now remains; and in some cases his glowing tints and other colours have changed or disappeared altogether, owing to his indiscriminate use of perishable materials; for he was a very indifferent chemist.

"The cracking of his pictures is chiefly occasioned by painting over his preparation before it was thoroughly dry, or by using materials on the surface of his pictures, which dried harder than those employed underneath.

"Dark colours, and especially those which are transparent, will generally open in large cracks when laid on very thickly, or employed with much vehicle; and this was frequently the case with Sir Joshua's pictures, whose dark back grounds, hair, and draperies, were often painted with a considerable body of colour.

"In comparison with Titian, and Paul Veronese, all the other Venetian painters appear hard; they have in a degree, the manner of all Rembrandt's, *mezzotinto*, occasioned by scumbling over their pictures some dark oil colour."

In Sir Joshua Reynolds's memoranda, for December, 1755, will be found the following record of the colours, which he then made use of, and of the order in which they were arranged on his pallette.

SIR JOSHUA REYNOLDS' WORKING COLOURS, WITH THE ORDER IN WHICH THEY WERE ARRANGED ON HIS PALLETTE.

"For painting the flesh, black, blue black, white, lake, carmine, *orpiment*, yellow ochre, ultramarine, and varnish.

"To lay the pallette:—first lay carmine and white in different degrees: second, lay *orpiment* and white, ditto: third, lay blue black and white, ditto.

"The first sitting, make a mixture on the pallette for expedition, as near the sitter's complexion as you can."

HIS OBSERVATIONS ON COLOURING.

"To preserve the colours fresh and clean in painting; it must be done by laying on more colours, and not by rubbing them in when they are once laid; and if it can be done, they should be laid just in their proper places at first, and not be touched again, because the freshness of the colours is tarnished and lost, by mixing and jumbling them together; for there are certain colours which destroy each other by the motion of the pencil when mixed to excess.

"For it may be observed, that not only is the brilliancy, as well as freshness of tints considerably impaired, by indiscriminate mixing and softening; but if colours be too much worked about with the brush, the oil will always rise to the surface, and the performance will turn comparatively yellow in consequence."

HIS INSTRUCTIONS IN PAINTING TO THE STUDENT.

"Never give the least touch with your pencil, until you have present in your mind, a perfect idea of your future work.

"Paint at the greatest possible distance from your sitter, and place the picture occasionally near

to the sitter, or sometimes under him, so as to see both together.

"In beautiful faces, keep the whole circumference about the eye in a mezzotinto, as seen in the works of Guido, and the best of Carlo Maratti.

"Endeavour to look at the subject, or sitter before you, as if it was a picture; this will in some degree render it more easy to be copied.

"In painting, consider the object before you, whatever it may be, as made out more by light and shadow, than by lines.

"A student should begin his career, by a careful finishing and making out of the parts, as practice will give him freedom and facility of hand; a bold and unfinished manner is generally the habit of old age."

ON PAINTING A HEAD.

"Let those parts, which turn or retire from the eye, be of broken or mixed colours, as being less distinguished, and nearer the borders.

"Let all your shadows be of one colour; glaze them till they are so.

"Use red colours in the shadows of the most delicate complexions, but with discretion.

"Contrive to have a skreen, with red or yellow

colour on it, to reflect the light on the sitter's face.

" Avoid the chalk, the brick dust, and the charcoal, and think on a pearl, and a ripe peach.

" Avoid long continued lines in the eyes, and too many sharp ones.

" Take care to give your figure a sweep or sway, with the outlines in waves, soft, and almost imperceptible against the back ground.

" Never make the contour too coarse.

" Avoid also those outlines and lines which are equal, which make parallels, triangles, &c.

" The parts which are nearest to the eye appear most enlightened, deeper shadowed, and better seen.

" Keep broad lights and shadows, and also principal lights and shadows.

" Where there is the deepest shadow, it is accompanied by the brightest light.

" Let nothing start out, or be too strong for its place.

" Squareness has grandeur; it gives firmness to the forms: a serpentine line, in comparison, appears feeble and tottering.

" The younger pupils are better taught by those who are in a small degree advanced in knowledge

above themselves; *and from that cause proceeds the peculiar advantage* of studying in academies.

"The painter who knows his profession from principles, may apply them alike to any branch of the art, and succeed in it.

"ON THE EXAMINATION OF PICTURES.

"After a strict examination of the best pictures, the benefit to be derived from them is to draw such conclusions as may serve in future as fixed rules of practice, taking care not to be amused with trifles, but to regard the excellencies chiefly.

"There are some who are very diligent in examining pictures, and yet are not at all advanced in their judgment, although they can remember the exact colour of every figure, &c., in the picture; but not reflecting deeply on what they have seen, or making observations to themselves, they are not at all improved by the crowd of particulars that swim on the surface of their brains, as nothing enters deep enough into their minds to do them benefit through digestion.

"A painter should form his rules from pictures rather than from books or precepts; this is having information at the first hand,—at the fountain-

head. Rules were first made from pictures; not pictures from rules. The first compilers of rules for painting were in the situation in which it is desirable a student should be. Thus every picture an artist sees, whether the most excellent or most ordinary, he should consider from whence that fine effect, or that ill effect, proceeds; and then there is no picture, ever so indifferent, but he may look at to his profit.

"The manner of the English travellers in general, and especially those who pique themselves on studying *virtu*, is that, instead of examining the beauties of those works of fame, and *why* they are esteemed, they only inquire the *subject* of the picture, and the *name* of the *painter*, the history of a statue, and where it was found, and then write that down. Some Englishmen, while I was in the Vatican, came there and spent above six hours in writing down whatever the antiquary detailed to them; they scarcely ever looked at the paintings the whole time."[1]

[1] Our readers will please to recollect that this just, but by no means complimentary, description of English travellers, was written in the interval between 1749 and 1752, the period during which Mr. Reynolds was in Italy; but ninety years must make a great change in the information and manners of any civilized nation. That

As Sir Joshua Reynolds was the great master of colour and effect, and, in fact, the founder of the present high character which the British school seems to hold, decidedly and almost exclusively, in these two great sections of the art, his sentiments and principles in these matters are entitled to the first consideration. They are founded upon accurate observation, and practical acquaintance with the sound principles of art, with which he took no ordinary pains to be well acquainted; and this extensive and accurate knowledge being directed in its operation by a mind like his, at once endowed with good sense and sound cultivation, produced those admirable specimens of painting which the world admires, and it is hoped long will admire.

To dissent, therefore, from any mode of combining colours, laid down by this great artist, for the process of painting, might look, at first sight, like a species of pictorial heresy. But the duty that we have imposed upon ourselves, and the interests of the arts, oblige us, on the most solid grounds, to point out an error of a very serious

sketch would not now have much more resemblance, we should think, to the manners of our present race of travellers, than Hogarth's dresses of the same period have to our present costume.

nature in Sir Joshua's system of combining some of his colours; and most probably that very error, which has caused so much discoloration to some of his finest and originally most effective pictures.

Our readers will perceive that, in our quotation from his notes on the combination of colours, Sir Joshua frequently mentions "Orpiment," and that we have marked the word in italics for the purpose of making these observations. Now it is quite evident that orpiment, most probably the red sort, *realgar*, which is of a rich orange hue, was a favourite pigment upon Sir Joshua's palette, and he directs that it should be mixed with the usual sort of *white lead*; and he chiefly used it in either glazing, or scumbling this colour upon his solid first painting. The orpiments, red and yellow, have been in use from the earliest times of this art; but the artists of the great schools of painting appear to have been aware of their injurious qualities; for they employed the orpiment alone, or else with ochres and other colours, that do not act upon them, as *terra verte* and *ultramarine*; and there is not a doubt but that the brilliant yellows which we see in some ancient pictures, are preparations of *orpiment*; but then they were laid on pure, without any mixture of white lead; for these two pigments

are mutually destroyers when combined. Speaking of the orpiments, M. Mèrimée says most justly, (page 107) "It is easy (for a chemist) to perceive that these colours must not be mixed with white lead, nor with any of those colours into which lead enters, such as massicot, minium, muriate and chromate of lead, and Naples yellow.

"For," he continues, "the sulphur in combination with the arsenic, having less affinity with this metal than for lead, lets the arsenic go, and forms a sulphuret of lead of a dark greyish colour." And in a note M. Mèrimée adds,—

"It is probable that, after some time, the *orpiment* takes up the oxygen from the lead; this would be an additional cause for the darkening of the two colours."

And this is precisely the mischief which has befallen the works alluded to of this great artist; for, unhappily, he had no knowledge of chemistry, by the aid of which he could at once have detected and put a stop to those errors so fatal to these splendid works.

Sir Joshua also used too much asphaltum and a preparation of wax at one time; and he laid it on thickly with a good deal of vehicle, which, after some time, opened in large cracks. The same

disadvantage has arisen in others of his pictures, caused by painting or varnishing over his preparation before it was quite dry, and using harder materials than those underneath them.[1]

Orpiment is still used to some extent in our school; and so long as the contact of lead with it is avoided, it will do good service for a colourist.

Asphaltum likewise, which, like orpiment, is very attractive, both in aiding colour, and in *chiaro 'scuro*, has some very practical advocates, even amongst our leading artists. It is hoped that their works will not be the worse for its agency at some future time.

With respect to the methods and materials used at present, and which have been for some time employed by our principal artists, they are only modifications according to circumstances, of many of the materials[2] and processes described by M.

[1] Sir Joshua Reynolds tried his new speculations in colour and vehicle, painted on panels or canvasses, which he kept by him many years. At the sale of his things these "trial boards" came into the possession of Sir T. Lawrence; and they were sold afterwards at Mr. Christie's: some of the tints were discoloured.

[2] White or cream-coloured grounds, slightly absorbent, either on panel or cloth, have lately come much into use. This is a great improvement. These grounds never devour the colour, as dark grounds do in time, but aid the brilliancy of the tint, by taking off the redundant oil, &c., and give an evenness of tone by

Mérimée, with the original version, of which several of our Royal Academicians are acquainted. But as these essential parts of an artist's knowledge are not extensively known in the profession, the president and members of the Royal Academy have, much to their honour, suggested and encouraged the publication of this practical work, that its instructive pages may be open to all who practise painting; and that it might not remain "a sealed book," as it must have done, to a great many young artists, but for this circumstance.

The leading painters of the English school use a rich full pencil in the lighter parts of their pictures, and keep their shadows thin and transparent; over this full body of colour the various glazings and scumblings are passed rapidly, to prevent the surface being rubbed up; upon these glazings, &c., solid colour is again applied, and other glazes follow; and so on, until the intended effect is obtained; and with the more skilful practitioners there is little chance of not getting the exact colour or tint required. So much is this the case, that in the two fascinating portions of the

time. Panels are always preferable to canvasses, but cannot now be procured of large dimensions, and are much dearer than primed cloths.

art, "effect and colouring," the palm is given to the English school.

And could the fine, correct, and noble style of drawing, seen so conspicuously in the great Italian masters' works, and their elegant and natural ideas of composition, be added to these qualities, a school of arts near perfection would be the result; but such a school of painting has never yet been seen in Europe. The best French artists are very able and correct designers; they draw the human figure well, and some of their late pictures show a decided advance in composition, expression, and effect. The German artists are also making good progress in the higher walks of art. But these votaries of the graphic muse are supported and encouraged handsomely by their respective governments, and they are proving themselves grateful and worthy of the just aid they receive; they will in time return its value to their respective countries, at least one hundredfold, for the culture now bestowed upon them.

But as we, in this wealthy and enlightened nation, have not any excitement of that kind, it would be rather too much to expect, that men of high talents and manly feeling, should devote their best energies and knowledge, to the production of works, by which they would not be

enabled to maintain a respectable appearance in society; although these works might afterwards be looked upon with the greatest admiration, and become a fortune to their future possessors.

The truth is, that painters must live, as well, but not so expensively, as politicians; and whenever any of the latter gentlemen shall lay down "their lives and fortunes" for the glory of their country, we pledge ourselves that painters will be found to emulate their glories, and to share in their renown. There is a capacity and a spirit in the artists of England, whether in painting, sculpture, or architecture, able to achieve the greatest things in their art, provided, that those who hold the destinies of the empire and its revenues in their hands, will only do *their* duty in this important national concern.

CHAPTER II.

ON THE PRINCIPLES OF HARMONY IN COLOURING.

THIS fascinating member of the pictorial art, has but of late excited particular attention amongst the artists of France; and our readers have before them the best exposition of the theory of colouring, which we are aware has yet appeared on the continent.

In the diagram of M. Mèrimée, the three primitive colours, and their three decided binary compounds, are duly arranged in their natural prismatic order; and it is most likely this arrangement is an original one, as that author does not refer to any previous authority relative to its invention.

In this country, however, we have been engaged in inquiries on the theory of colours, and the principles of harmony in colouring, so far back as 1766; when Mr. Moses Harris, the naturalist,

author of the *Aurelium*, wrote and published a small but clear and comprehensive treatise on these portions of science, which he most satisfactorily and clearly demonstrated by a circular diagram, of which a figure is given, and other specimens of its application in the arts, all deduced from Newton's Theory of light and colour.

This work of Mr. Harris is so very scarce, that I have never seen a copy of it; but by good fortune, and no small exertions, I have had the original MS. under my inspection [1], and it is precisely what Mr. Phillips, R. A., described it to be. Were it not for the latter gentleman, it is probable that this small, but clever and useful book, might have been lost to the world.

Mr. Phillips fortunately met with a copy of it, and finding in it the corroboration of certain ideas that he had on colouring, the professor introduced the diagram and the theory into his course of lectures, about 1827. We have stated that M. Merimée's arrangement of colours is correct, and his deductions from them to explain the harmony of colouring in pictures, are fair so far as they go, and are satisfactory as to chromatic harmony:

[1] It is in the hands of his grandson, Mr. L. Harris.

in Moses Harris's works, there is no deficiency in these respects, as I hope to show from Mr. Phillips's eighth lecture "on colouring," &c. Having despaired of ever getting a sight of Mr. Harris's work, I requested permission from Mr. Phillips, to make some extracts on this subject, from his published course of lectures, delivered at the Royal Academy, to which the professor at once kindly assented; and our readers will now have an opportunity of observing the two systems, English and French, placed before them for the first time, and will be thereby fully enabled to judge of their merits.

Mr. Phillips says "coloured substances obtain their hues from light, and lose them when deprived of it. Connect this proposition with another; viz. that shade, abstractedly considered, is always alike in tone; and you will then perceive, that the same tone of darkness, whatever may be its degree, pervades all colours as they recede from the light, to their complete union and total loss in shadow.

"We may arrive at the same conclusion by a more technical mode of proceeding; and for the purpose of explaining it, I lay before you the ingenious diagram given in a work published many years ago by Moses Harris, under the title of "The

Natural System of colours." In the circular portion of this diagram, the prismatic colours, red, blue, and yellow, are united, consonant with the system of the rainbow, by orange, green, and purple, and all are graduated from the centre outwards, that is, from their utmost intensity to the faintest tint approaching to white; and those tints are marked by a scale of strength, say twenty-five, supposing the five marked circular spaces to contain five degrees each.

By the central part of the diagram it appears, very clearly, that the union of the three primitive colours, (as he well terms them,) red, blue, and yellow, in the pigments we employ, is productive of black, or a tone in which there is a total privation of all colour, and which therefore assumes the perfect character of shade.[1]

Now, if the union of the three primitive colours in their utmost degree of intensity be productive of perfect shade, it must be apparent that their union in fainter, but equal degrees of tint, must be productive of the same negative colour or tone, in a

[1] In curious contradistinction of the effect of aërial prismatic colours, the production of their union being white light. Nevertheless they agree in one point, viz. that each is a negation of colour.

degree consonant to that of the tints of the colours employed, proving that which I before stated, viz. that all shade in every degree is alike in tone, and will produce the like effect on every coloured object subjected to it.

These two points then,—truth of imitation of an actual colour, and unity of shade, I conceive to be the firm, though simple basis of true colouring, in its primitive purity and simplicity, that is, when considered without regard to reflections, yet operating over these when they are admitted for reflection, being light transmitted through another medium, but produces another colour upon the surface of the body where it reaches; and its gradations to the shadowed parts where it cannot reach are subject to the same law.

"Thus much for the consideration of any single colour and its varieties, in union with shade. Our next object is the union of the different colours with each other. It appears, from numberless observations, that the human eye is so constituted with respect to colour, that though it derives pleasure from viewing each of the three primary colours alone, yet if two of these are introduced to its view together, it then requires, for its entire gratification, the presence of the third also; and that

want causes a physical sensation in the eye itself, which, without mental agency, and in a manner unknown to us, produces the third colour.

For let those two colours be united, and the compound colours formed by their union be exposed to the eye for a time, and then suddenly removed from before it, the form of the figure in which the compound colour was exhibited will remain present to the view, but tinged of the colour omitted: that is, if the compound be purple, the spectrum will be yellow; if orange, blue; and if green, red; and even while the original colours are singly before the eyes, if regarded attentively, each of them will be seen surrounded by the compound of the other two.

This points out, I conceive, the physical source of that pleasure which we derive from well arranged colouring, and of those sensations of gratification or of dissatisfaction which must have been frequently experienced by every painter as he produced or neglected the requisite unions of colours.

We universally acknowledge great delight in regarding the rainbow, and no one has yet discovered an arrangement in colours more gratifying to our eyes or to our understanding.

When the three primary colours are placed be-

fore us, our eyes accept the vision with a certain degree of pleasure, but they are most gratified when the intermediate colours are properly introduced, and the whole scale of the colours which constitute a ray of light is presented to them.

This arrangement, then, seems the most proper for adoption by the painter, as producing the most pleasing concord of colours; and we may safely conclude, therefore, that such an arrangement of colours is the best adapted to our vision, and produces just that order which is most acceptable to our eyes.

In this we have one principle of harmony in colouring,—the harmony of arrangement. It may perhaps be said, that this is rather more according with melody in music than with harmony: still it enters into those combinations for which in colouring we have no other name than harmony.

Consonance, or harmony of hue, consists in those colours being brought together, which, though they may not be placed exactly in the regular order seen in the rainbow or in the chromatic scale, yet act in accordance with each other upon the eye, and produce no uneasy sensations within it, but rather afford it pleasure.

There are two gradations in this portion of harmony of colouring. There is first, as I have just said, a certain degree of accordance between the three primary colours when arranged beside each other. But, secondly, a more perfect accord ensues when any two of them are united, and the compound placed beside the third, both evidently depending upon the relation they bear to the prismatic colours in a ray of light.

It is to the eye that colours address their power, and it may fairly be assumed, that whatever colour is produced by the eye during the presence of another colour, but seen most clearly when the first presented to it is removed, must have been required by it to perfect its pleasure, and, therefore, that such colour must be the harmonizing one with the original colour, or that which forms a union with the other agreeable to the eye.

This we find accordant with experience. The primitive colour which harmonizes best with purple is yellow; with green, red; with orange, blue. And again, that these are the colours which most perfectly associate is proved, it appears to me, by their union in any degree of tint producing a negative colour, and in their extreme intensity in black, which the union of no two other colours will do,

except such compounds as have relations similar to theirs.

Another point requisite to produce harmony is, that the colours used to produce it be of the same degree of strength in the scale. To explain this I shall refer to Mr. Harris's diagram.

Suppose we take a red at the fifth degree of intensity, and a green at the twentieth, or a purple at its extreme degree of power, and a yellow at the fifteenth, it will not require much argument to prove their want of perfect accordance; but if you take either of those unions of harmonizing colours at the same degree, say the tenth or the fifteenth, the eye accepts their union as agreeable.

I have thus endeavoured to explain to you the nature of the second principle of harmony in painting; there is still a third wanting to render it complete: that is, unity of tone produced by the colours being all wrought under the influence of the same illumination, by which I mean a light equal in its degree of intensity and of tone.

On these three points, then, depends that agreeable accordance of effect in the colouring of a picture which we term "harmony," viz. in the order of their arrangement; in the employment of those accordant in their nature, that is, equal in their

scale of hue or of tint; and their being seen under a like degree of illumination, unity of shade being implied of course.

The next point for consideration is contrast of colour; a principle, in my view of it, opposed to harmony, but creative of richness and vivacity in the effect of a picture.

Contrast signifies opposition or discordancy among things, and in that sense I prefer employing it, and confining it specifically to those oppositions of colours which are discordant to the eye, as now commonly employed relative to colouring. It has no specific meaning, except as another term for variety.

I have already spoken of the colours, whose effects upon the eye unite agreeably, and when placed beside each other produce harmony; as yellow and purple, blue and orange, red and green, in equal degrees of the scale throughout all their varieties, and you will find in the diagram of Mr. Harris, all those colours which thus unite, stand opposite to each other in the circular portion of it, and therefore have been miscalled "contrasts."

The colours most strongly contrasting with each other, are any two of the three primitives which stand triangular-wise in the diagram, as red, blue,

&c., as they not only have distinct qualities, but also have no point of union, except for the production of other colours; and when presented to the eye together, they produce an uneasy sensation within it. It is the same with orange and purple, or orange and green[1], though the contrasts they form to each other are less powerful than any two of the primary colours; and all further compounds of them, partake less and less of that character; such contrast will produce similar effects in every degree of the scale.

The principles, whereon depend the means productive of good colouring, when employed by the man of genius, are truth in imitation of the actual hues[2] of the objects to be represented; unity in their shade, and consequently in their half tint;

[1] There being too large a portion of yellow in combination with the red and the blue employed, to produce the effect of a perfect ray of light.

[2] To give the mind a clear view of the meaning attached to the terms hue, tint, and tone, Mr. Phillips defines a hue to be the positive colour of the object, that which distinguishes one from another, as red from blue, and blue from yellow, throughout all their combinations. A tint means the gradations of any one colour from its extreme intensity to its faintest degree. And tone he would attach only to the effect produced by the degree and colour of the illumination, and the shadows it produces.

harmony of arrangement and of hue, with contrast and reflection, to enrich and invigorate them.

These regulations govern throughout every portion of the scale of colours, from their faintest to their deepest tint, from the degree employed in the sky, and the most distant parts of a landscape, to those employed on its foreground, and to the still stronger colours to which the portrait or the historical painter resorts, or the more directly primitive hues, by which are represented the choicest productions of the garden.

I have thus, through the good feeling of Mr. Phillips, found myself at liberty to lay before my readers copious extracts on that beautiful and interesting quality in picture, "harmony of colouring," as nnderstood not only theoretically, but practically in the English school of painting, of which the best works in our exhibitions, give undeniable and often charming evidence. This work (Mr. Phillips's course of lectures on painting,) is, in our opinion, one of the best treatises on the "History and principles of painting" in the English language, and ought to be in the hands of every artist, who wishes to be guided by the most sound principles of the art,—in invention, drawing, or

design, composition, colouring, and *chiaro 'scuro*[1], or effect.

[1] Of the exact meaning of this term it is difficult to convey a perfectly clear idea in our language to the general reader. To artists it requires no translating. Our words "light and shade" do not convey the true meaning, although these two qualities form its basis. It means the whole effect which the principal masses of light and their subordinates produce as opposed to the medium and darker masses of shadow.

CONCLUSION.

HAVING reviewed the past and present state of the arts in Britain[1], we cannot close this sketch

[1] We feel that an essential part of our duty would have been strangely neglected, had we closed this outline of the history of English art, without giving the names of as many as we can collect at this moment of the real admirers and promoters of the arts in Britain. Some of those estimable and enlightened noblemen and gentlemen are gone, and no longer promote the arts; but their memories will ever be held in grateful remembrance by all those who value the advancement of the arts in Britain. Amongst the most recent of these friends of art, whose loss will be felt extensively, are the late Dukes of Sutherland, and Buckingham: Lord de Tabley (the first who collected the works of native painters), the Earl of Egremont, Lord Farnborough (his lordship bequeathed to the nation pictures valued at £10,000); Earl Mulgrave, Lord Monson, Walter Fawkes, Esq., of Farnely Hall (who made the first great collection of water colour drawings), the Rev. Hollwell Carr (who bequeathed to the nation pictures worth £25,000). These are a few the memory just furnishes; but there are many other names dear to the arts, which cannot be forgotten.

We are most fortunate still to have worthy successors to those patrons, whose loss the arts must deplore; who are to be seen

of that important subject properly, without making such of our readers as may not be aware of the fact,—acquainted with a plan that was suggested in 1809, "for the national encouragement of painting in the united kingdom;" it originated in a conversation with the late Sir T. Barnard, and the late Sir G. Beaumont, two directors of the British Institution, and Sir M. A. Shee, P.R.A. The president in consequence, at the request of those gentlemen, drew up the plan, which the directors submitted to the then prime minister, Mr. Perceval, who, after considerable delay, declined to take any proceeding on the subject, the country being at that time still engaged in a tedious and expensive war.

The plan alluded to we have seen: we think it

constantly in the walks of art, purchasing works of real talent, and in various modes assisting to raise the arts of their country to its proper eminence. Need it be mentioned that, amongst the foremost of these sincere friends of the arts, are their graces the Dukes of Sutherland, Devonshire, and Bedford; the Marquesses of Lansdowne and Westminster; Earls Aberdeen, Essex, Normanton and Aylesford; Lords F. Egerton and Northwick; Sir T. Baring, Sir R. Peel, N. W. Ridley Colborne; Messrs. T. H. and H. P. Hope, Samuel Rogers, C. B. Wall, M.P., Joseph Neeld, M.P., W. Wells, J. W. Thompson, Robert Vernon, Esq., &c. &c. &c.

All these noblemen and gentlemen are directors or members of the Royal British Institution, Pall Mall.

would have been admirably adapted to the purpose, and it is a matter of serious regret to us, that we cannot find room in our "sketch" for the greater part of this valuable document: all that can be done in this case, is to give merely the enumeration of the prizes intended to have been instituted for this purpose.

There were three prizes proposed, to be divided into three classes, and decreed with public solemnity every third year.

The first class to consist of three prizes, and to be appropriated to those who, by a noble application of their powers, should most successfully promote the cause of religion and morality, stimulate the cause of public virtue, and commemorate the glories of our country.

The second class, three prizes, to be devoted to subjects drawn from ancient history, poetry, or romance; (these to be on a smaller scale.)

The third class, three prizes, to be devoted to subjects of a more miscellaneous character than the foregoing, but still the subject must come within the description of historic art.

Subjects of the first class, to be chosen by the artists themselves; each picture to contain at least thirteen figures the size of life, and no picture to

exceed the dimensions of the *cartoons* at Hampton Court.

The first prize of the first class to be 3000*l.*; 2nd prize, 2000*l.*; 3rd prize, 1000*l.*

The subjects of the second class to be chosen by the artists, candidates; each picture to consist of at least seven figures (size of life); if on a smaller scale, to consist of thirteen figures; no picture of this class to be smaller than the "Death of General Wolfe," by West.

Of this class, the first prize to be 1500*l.*; 2nd, 1000*l.*; and 3rd, 750*l.*

Subjects of third class to be chosen by artists, candidates; the limitation as the second class, but unrestricted as to the number of figures; being intended to embrace all such productions of the pencil, of one figure or more; the size not to be smaller than those of the "Sacraments," by Poussin.

First prize in this class, 750*l.*; 2nd, 500*l.*; and 3rd, 300*l.*

A reward of 500*l.* each to three most deserving candidates of the first class, who have not got a prize.

300*l.* to each of three unsuccessful candidates in the second class.

150*l.* to each of three unsuccessful candidates in the 3rd class, who shall be judged most deserving.

The prize pictures to become the property of the nation; to be presented as an honourable decoration to some of our churches, palaces, or places of public worship; the pictures to be publicly exhibited at the British Gallery for two months; a committee of the directors and of the Royal Academy to examine all the works offered for the prizes.

To supply the funds, 5000*l.* to be voted annually by Government, under the management of the president and directors of the British Institution.

This sum to be annually placed in the funds; at the end of the third year the whole, with the interest, to be applied to carry the object into effect.

This plan was certainly calculated, if carried into effect, to arouse the higher energies of British genius; and perhaps some great statesman may yet arise in our country, capable of properly estimating the arts, and at the same time with eloquence to persuade his opponents out of their erroneous opinions, or to enlighten their understandings in these important concerns. He should also be endued with an indomitable moral courage, and constancy in the promotion of those high interests, so dear to civilization: he should be unawed by the

vulgar clamour of party spirit, and despise the drivelling of *pseudo*-economists, mindful only of his country's prosperity and honour.

We are far, therefore, from despairing of the ultimate triumph of high art in England:[1] in every other great pursuit, whether naval or military, whether in the walks of elevated science, poetry, or general literature; the intellectual, as well as the moral and physical energies of the British people, have shown themselves second in achievement, we believe, to none, and superior to many nations.

[1] Previous to Horace Walpole's "Anecdotes of Painting," 1762-71, it appears as he states, that, while the French, Italian, and German authors, had written numerous works in commendation of the arts in those countries, "England, which does not always err in vaunting its own productions, has not a single volume to show on the works of its painters." The case is now in this respect very different.

There have been two large editions of the "Anecdotes" published since that time,—the last is Dallawy's; also Edwards's book on the same subject. The admirable courses of lectures alluded to, at the Royal Academy, by Sir Joshua Reynolds, Barry, Opie, West, Fuseli, and Sir M. A. Shee's Poem on Art, Mr. Northcote's and Mr. A. Cunningham's life of Reynolds, Mr. Beechey's edition of Reynolds's works, &c., Mr. Hope's excellent work, Mr. Sydney Taylor's, the firm and successful advocate for the preservation of the Ladye Chapel, St. Alban's Abbey, and above twenty of the handsomest of our city churches, and of the splendid screen of "York Minster," which had been wantonly doomed to destruction, Mr. Offley's work on art, &c. &c. The works of these gentlemen have in some degree vindicated the cause of the arts and of artists from the mass of ignorance and misapprehension, by which the public mind was long overshadowed with respect

Why any doubt should still exist, as to the national capabilities for excelling in the nobler arts, it is difficult, and for us impossible, even to conceive; we may be partial, perhaps, to the character of our native country, but until a full and fair trial of this important question shall have determined that we are wrong, we must beg leave still to maintain on this national subject our expressed opinions.

Amongst other proofs of our advancement in the arts, are two societies of architects that have been established within the last seven years. One is denominated "The Architectural Society" (35, Lincoln's-inn-fields); the other is called "The Institute of Architecture," and has its sittings at Brook-street, Grosvenor-square. This latter has a charter of incorporation; both these societies are self-supported.

"A School of Design" has also been established (1837) at the old rooms of the Royal Academy, Somerset House. This is supported by grants from the public funds; its object is to give instruction to the various classes of artisans and mechanics.

to the real state and character of our native school; and it is hoped that their good example will stimulate our men of literature generally, to look with the same kind and true feeling upon the fine arts of their own country, as the same valuable class do in France, Germany, and other continental nations.

There has also been formed, within a year or two, a society called "The Art Union Society;" the members of which subscribe a certain sum annually (one guinea, or upwards); these funds, after paying the expenses, are devoted to the purchasing of pictures, drawings, enamels, sculpture, medals, or engravings. Every member, for each guinea subscribed, is to have a chance of obtaining one work at the annual drawing of prizes; the work to be selected out of any of the exhibitions by the successful drawer of a prize.[1]

[1] The facilities for acquiring sound instruction in the true principles of art, have also increased considerably. The Royal Academy supports three schools in their establishment, viz. the Antique School, for studying from the best antique models, both in drawing and modelling; the Living Model School, for similar purposes. Into these two about twenty pupils are annually admitted; and have the privilege of studying for ten years. The Painting School is for the more advanced students; in this school they are instructed in copying some of the best pictures of the different schools, by which they are enabled to acquire a correct knowledge of the mechanical processes and materials employed in the good schools of art. Besides these means of practical instruction, there are five courses of lectures, likewise gratuitous; these are given to the exhibitors as well as students. The courses are on painting, sculpture, architecture, perspective, and anatomy. The professors now are Mr. Howard, Sir Richard Westmacott, and Mr. Wilkins: the professorship of perspective is vacant at present; the course of anatomical lectures is delivered regularly by Mr. Green, the professor.

Every second year three prizes (gold medals) are given; one

in each of the higher schools of drawing, sculpture, and architecture. Out of the gold medal men one is selected to be sent to Italy for three years; they are taken in rotation, and each is supported those three years at the expense of the Academy.

When the gold medals are bestowed, a number of silver medals, not exceeding fifteen, are also given to the students, three in each class, viz.:—drawings from the living model, models in clay, also from the life; drawings from an antique figure, or group, and models of an antique figure or group, and for architectural drawings of some one of our public buildings: and in the intermediate years, five silver medals are given. The lectures and premiums are provided for entirely out of the funds of the Royal Academy.

There are some other schools of instruction, but not of so complete a character as those of the Royal Academy. Mr. Sass is proprietor of one of these for elementary instruction in the principles of the art, and in drawing from the antique.

There is, likewise, the Living Model Academy, in Upper St. Martin's-lane, where the study of the antique and the living models is constantly carried on in the evenings. This is an independent society, which was formed about seventeen years ago, near Temple Bar; and numbered amongst its members some of the ablest artists of the British school. Its terms are very moderate, and its discipline similar to that of the Royal Academy.

There are, or were, also two or three places of study, termed "Rustic Academies," and "Drapery Schools;" but they do not appear to get much encouragement, as they tend to depress instead of elevating the taste of the students. Nothing fine in drawing, or elevated in character or sentiment, can be acquired in places where the clumsy and graceless figures and attitudes of our costermongers, gypsies, fishmen and women, &c., are the objects of study; and along with the loss of refinement in taste, there is great danger of the feeling for good colour being injured; and there is no chance of even a tolerable knowledge of drawing being acquired in these studios. As to subjects, they afford no higher views of human nature and action than the low Dutch schools; but are very much below them in all the mastery of the painting tools and materials.

The affection we bear to the arts obliges us to point out those very erroneous modes of study; these are not only our opinions, but also those of the ablest artists of the British school.

It was not by these modes of study that the artists now conspicuous in the British school acquired that knowledge and the refined taste, which raised them to the elevated positions where they stand, whether in painting, sculpture, or architecture:—in every one of these departments, the young aspirants for professional distinction will find the best examples of talent, and social qualities, which they would do well to imitate and acquire. Let the pupils, therefore, eschew discontent, and follow with patient industry and good feeling, their laborious avocation, as the surest and best means of attaining to the highest honours in their elegant profession.

Besides the exhibition at the Royal Academy, there are two others at the British Institution, Pall Mall; one in the earlier part of the spring, for new pictures, and one in the summer for old paintings. There is also the British Artists' Gallery in Suffolk-street, which opens in April for three months; and the old and new societies of Water Colour Painters; each of these societies has an annual exhibition, which is well attended.

The National Gallery, at Trafalgar-square, is open gratuitously to the public on the four first days in each week; and both here and at the summer exhibition at the British Institution, artists are allowed to copy the pictures under certain regulations.

Having now offered to the British public the above facts and circumstances, connected with the arts, in a compendious form, some of which lie scattered over the pages of numerous volumes, whilst others are produced for the first time, from the best sources of information; the Author respectfully submits his labours to the indulgent consideration of his readers.

THE END.

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